1998 CALIFORNIA TRANSPORTATION PLAN

STATEWIDE GOODS MOVEMENT STRATEGY

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EXECUTIVE SUMMARY

The Statewide Goods Movement Strategy is a strategic policy and action blueprint for improving the goods movement transportation system. This strategy focuses on improving existing system efficiency, through new technology and other means, to maximize system capacity and reliability, and minimize long-term transportation system costs. It has been prepared to ensure that the quality of life in California is maintained and improved in the future.

This strategy has been prepared as a response to recommendation two of the 1993 California Transportation Plan. It serves as one element, together with the Transportation System Performance Measures report, of the 1998 California Transportation Plan implementation update.

California is an economic powerhouse, fueled by the production, movement, and consumption of goods and services. The efficient movement of goods is essential to the prosperity of California. California's freight transportation system is the lifeline of the state's domestic and international trade, moving almost $640 billion worth of California commodities. Over 800 million tons of freight is moved out of, into, and within the state every year.

The state's mature transportation system of highways, rail lines, pipelines, airports and seaports serves a diverse range of needs for the movement of goods. The goods movement transportation system provides for the movement of local, regional, interregional, interstate and international commerce on an integrated, multimodal network. This system supports the economy by delivering raw materials, intermediate goods, and finished products to production, consumption, and disposition points. This excellent transportation system and California's robust economy are intricately linked.

California is expected to grow and prosper in the future, if the transportation system can keep up with forecast demands. In the 20-year period from 1992 to 2012, California's population is expected to increase by 40 percent, to almost 44 million people. Consumption of goods will grow by as much as 50 percent, and production will expand at almost the same rate. The volume of goods moved is expected to increase by 46 percent. This demands that direct action be taken by the State to maintain and improve the State's goods movement transportation system.

This strategy is based on a vision and commitment to the goods movement transportation system. The vision is that the State's transportation system is a balanced, integrated, multimodal network. Swift economic movement of goods through our airports and seaports throughout the State gives California businesses a competitive edge by adding value to their products and services. The commitment is

that Caltrans fosters the development of an integrated, multimodal goods movement transportation system that is safe, efficient and effective. It recognizes that this statewide system of highways, rail lines, pipelines, air cargo facilities, seaports, and space launch and recovery facilities is essential to a healthy economy and quality of life in California.

Ten strategic policies are outlined to direct the State's response to the maintenance and improvement of this system. They are based on the CTP Guiding Principles (see report Section II). The strategy's strategic policies are:

1. The State's multimodal goods movement transportation system shall be maintained and improved.
2. Goods movement must be given full and appropriate consideration in the planning, design, development, operation, maintenance, and funding of the State's transportation system at the State, regional and local level.
3. The State shall participate, to the extent allowed by law, in the planning, developing, and funding of each modal component of the transportation system, including highways, rail lines, airports, seaports, pipelines, space launch and recovery facilities, intermodal terminals and border crossings.
4. The State must have the financial and technical flexibility, to the extent allowed by law, to respond to transportation problems that are in the public interest, regardless of facility or mode.
5. The State shall take a long-term approach in planning and investing in California's transportation system for the next generation.
6. Statewide system investments should initially be focused on those interregional corridors and facilities that carry and handle the primary share of goods movement today and into the near term.
7. The State recognizes that the feeder access network of highways, roads, branch and shortline rail lines, and smaller seaports and airports must also be maintained as fundamental components of the State's transportation system.
8. The State shall maximize transportation system performance and system preservation by pursuing cost-effective new technology approaches and operational strategies.
9. State goods movement improvement efforts shall be customer based, customer focused, and customer responsive.
10. The State shall work in close partnership with all levels of government and the private sector, and seek integrated, consensus solutions to transportation issues that enhance public safety, environmental resources, and quality of life.

The goals and objectives of the strategy set the direction for the specific long-term improvement of the goods movement transportation system. The first goal is:

Enhance California's economic vitality by improving multimodal access and mobility for goods. The objectives under this goal are:

1. Reduce nonrecurrent delay due to accidents and other incidents.
2. Reduce recurrent delay on the transportation system.
3. Reduce the number of transportation system miles requiring immediate rehabilitation.
4. Reduce delays at California state and international borders.
5. Improve intermodal access and connections between airports, seaports, border crossings, and rail, truck and intermodal terminals.
6. Reduce physical, operating and regulatory impediments.

The second goal is: **Develop and manage the transportation system based on explicit understanding of system performance and customer expectations.** The objectives under this goal are:

1. Develop improved analysis tools and information to support evaluation of goods movement transportation system performance, improvement alternatives, and community and other significant impacts.
2. Expand and strengthen partnerships between the goods movement industry and the public sector.

This strategy recommends that the 34 High Emphasis Routes, as identified in Caltrans 1998 Interregional Transportation Strategic Plan (ITSP), as the initial system focus of this strategy. This includes an initial 10-route subset of these routes as Caltrans highest focus priority (i.e., Focus routes). This strategy further identifies examples of gateway routes through the main urban gateway regions, the State's Class I rail lines, and major seaports and air cargo airports, as identified in the 1996 Intermodal Corridors of Economic Significance (ICES) report.

The actions identified in the Goods Movement Strategy should improve the state's transportation system in a variety of ways. The number of traffic bottlenecks will be reduced, safety will be improved, congestion will be reduced, cooperation and coordination will be increased, and better information will be provided to customers and decision-makers. The goods movement strategy will employ and mainstream new technology improvements into the transportation system wherever appropriate.

A series of action alternatives was identified for possible implementation through the strategy to address goods movement transportation system issues. The 64 actions identified address the strategy's seven issue categories: Capacity Constraints/

Network Limitations; Design Restrictions; Operational Issues; Safety and Maintenance; New Technology Development and Implementation; Funding, Programming, and Planning Constraints; and Policy, Regulatory and Institutional Restrictions.

The inventory of actions was subject to an evaluation to select those that would be recommended for implementation as part of this strategy. A sketch-level benefit/cost analysis approach was used. Three evaluation categories, covering 27 different evaluation criteria, were used to analyze the actions. A final sensitivity analysis test was used, in conjunction with professional judgment, to finalize the recommended action list.

42 actions are recommended for implementation and are listed in the table below. The recommended actions are the high priority measures that the State, regional, local and private partners should undertake now and over the next five years to improve the goods movement transportation system. For each action, an agency or governmental level that is responsible for or has the lead in implementing an action is identified. This responsibility identification should be interpreted broadly, however. Most actions will require involvement from a number of stakeholders at the federal, State, and local level. In most cases, private sector involvement will be mandatory to make sure the most appropriate responses are planned, designed and implemented. The implementation time frame listed is also quite broad. Actions are described as either short term (i.e., to be completed in the next five years) or long term. The recommended actions are:

ACTION CATEGORY / ACTION	***RESPONSIBLE AGENCY***	***TIME FRAME***
Capacity Constraints/Network Development		
• *Develop the State Highway System*	-	-
• Prepare Major Investment Studies/Corridor Studies	Caltrans/Regions	Short
• Evaluate Truck-Only Facilities	Caltrans/Regions	Short
• Improve and Rehabilitate Rural Highways	Caltrans/Regions	Long
• Expand Development of Grade Separations	Regions	Long
• Expand Border Infrastructure	Caltrans	Long
• Facilitate Intermodal Terminal Development	Regions/Private Sec.	Long
• Expand Airport Cargo and Seaport Facilities	Regions/Private Sec.	Long
Design Restrictions/Network Improvements		
• Identify System Design Restrictions	Caltrans/Regions	Short
• Identify California's Extra-Legal Load Network	Caltrans	Short
Operational Improvements		
• *State and Regional Transportation Information and Management Systems*	-	-
• Expand and Upgrade Regionwide Transportation	Caltrans/California	Short

Management Centers (TMCs)	Highway Patrol (CHP)	
• Develop Smart Traveler Systems	Caltrans/Regions	Short
• Optimize Local Arterial System	Regions/Local Gov.	Long
• Develop Border Operational Improvements	Caltrans/CHP	Long
• Improve Terminal Access	Regions/Private Sec.	Short
• Standardize Exit Signing	Caltrans	Short
• Examine/Facilitate Freight Rail Operations	Private Sector, Caltrans/PUC	Short
Safety and Maintenance Improvements		
• Enhance Safety Monitoring and Warning Devices	CHP/Caltrans	Short
• Improve Grade Crossing Safety	Regions	Short
• Extend Commercial Vehicle Inspection Station Operating Hours	CHP	Short
• Develop In-Route Parking Facilities	Regions/Private Sec.	Short
• Improve Hazardous Materials Information Systems	Federal Government	Short
• Develop Intelligent Vehicle Initiative	Fed. Gov./Caltrans	Long
• Enhance High Emphasis Route Rehabilitation	Caltrans	Short
New Technology Development/Implementation		
• New Technology Development/Implementation	Caltrans/Private Sector	Short to long
Funding, Programming and Planning Enhancements		
• Revise Programming Guidelines to Address Goods Movement	Caltrans/CTC/ Regions	Short
• Develop Goods Movement Project Funding Guidebook	Caltrans	Short
• Expand Public/Private Partnerships	Caltrans	Short
• Advance Multistate/Multinational Transportation Planning	Caltrans	Long
• Prepare State Freight Rail Study	Caltrans	Short
• Develop Goods Movement Local Accommodation and Impacts Guide	Caltrans/Local Governments	Short
• Develop Goods Movement System Performance Measures	Caltrans/Regions	Long
• *Enhance Goods Movement Analysis Tools*	-	-
• Enhance the Intermodal Transportation Management System	Caltrans	Short
• Develop the California Aviation System Plan Air Cargo Module	Caltrans	Short
• Continue MPO/RTPA Freight Element Model Development	Regions	Short
• Improve Goods Movement Data Base	Caltrans/Regions	Short
Policy, Regulatory And Institutional Improvements		

• Develop Commercial Vehicle Information Systems and Networks	CHP/Caltrans	Long
• Streamline Commercial Vehicle Registration Process	DMV/Private Sector	Short
• Foster Emission Reductions and Improved Freight Engine Technology	Calif. Air Resources Board	Long
• Examine Public Funding of Publicly-Owned Transportation Facilities	Calif. Transportation Commission	Short
• Examine Rationale for Public Funding for Private Projects	Caltrans	Short
• Build Closer Relationships With Goods Movement Industry	Caltrans/Private Sec.	Short

I. INTRODUCTION: CALIFORNIA'S ECONOMY AND GOODS MOVEMENT

The Statewide Goods Movement Strategy module is a strategic policy and action blueprint for improving the goods movement transportation system. This strategy focuses on improving existing system efficiency, through new technology and other means, to maximize system capacity and minimize long-term transportation system costs.

In 1991, federal law established a new vision for surface transportation in America. This new law, known as the Intermodal Surface Transportation Efficiency Act (ISTEA), declared that the national transportation system should be intermodal in character as well as economically efficient, environmentally sound, and socially responsive. Among its many requirements is one to establish a statewide planning process and to prepare a long-range state transportation plan.

To implement the planning feature of ISTEA, the California legislature directed the Department of Transportation to take the lead in preparing the California Transportation Plan (CTP). The CTP is a long range, strategic state transportation plan, developed in cooperation with local and regional agencies, as well as many others. One of the major recommendations of the 1993 CTP was to develop a comprehensive statewide strategy for improving the movement of goods. This strategy serves as one element, together with the Transportation System Performance Measures report, of the 1998 California Transportation Plan update.

This strategy was developed with the assistance of the California Transportation Plan Policy Advisory Committee (PAC), the Statewide Intermodal Goods Movement Advisory Committee (SIGMAC), and from input supplied by various levels of local government, private industry, and the general public. It is based on a series of issue papers. These papers are listed in Appendix A, and may be seen at the Caltrans Web site (**http://www.dot.ca.gov/hq/paffairs/ctp**). They also may be requested directly from Caltrans, Transportation Planning Program.

ECONOMIC SETTING

California is an economic powerhouse, fueled by the production and movement of goods and services. California's ports, harbors, and related businesses contribute over $40 billion per year to the national economic output, over one million jobs, over $20 billion in annual personal income, and over $8 billion per year to federal taxes and customs duties. In manufacturing alone, approximately two million people are employed with a payroll of about $65 billion per year.

The efficient movement of goods is essential to the prosperity of California. California's freight transportation system is the lifeline of the state's domestic and international trade, moving almost $640 billion of California's commodities in 1993. This is $180 billion more than Texas, the next highest state in terms of commodity shipments. Over 800 million tons of freight is moved out of, into and within the state every year.

International trade is an important component of California's vibrant economy. International trade amounts to some $260 billion. In 1994, there were over $40 billion in exports to Asia, with Japan, South Korea, and China being the top three export destinations. California's other top export countries are Canada and Mexico. In 1994, California had $16 billion in trade with Canada, and $13.5 billion with Mexico. Other major trading partners includes the United Kingdom and Germany.

While the flow of trade to other states and countries is important, it is secondary to intrastate goods movement. In 1993, more than 60 percent of all of goods produced in California moved to other destinations within the state, worth over $390 billion. In 1992, over 50 percent of all goods moved in California stayed in the state.

The state's mature transportation system of roads, rails, airports and ports serves a diverse range of needs for the movement of goods. The goods movement transportation system provides for the movement of local, regional, interregional, interstate and international commerce on an integrated, multimodal network. This system supports the economy by delivering raw materials, intermediate goods, and finished products to production, consumption, and disposition points. This excellent transportation system and California's robust economy are intricately linked.

TRENDS

California is forecast to grow and prosper in the future. However, that growth requires that transportation, water, and other public utility and service needs be addressed. In the 20-year period from 1992 through 2012, California's population is forecast to increase by 40 percent, to almost 44 million people. Consumption of goods will grow by as much as 50 percent and production will expand at almost the same rate. The volume of goods moved is expected to increase by at least 46 percent.[1]

Although the amount of goods manufactured will increase, the manufacturing sector will decline as a percentage of the state's economy. Manufactured products are tending to become smaller and the value of shipments per unit of weight will become even greater than it is today.

[1] Population estimates are based on California Department of Finance (DOF) forecasts. Consumption estimates also comes from DOF. Goods movement volume numbers are derived from Caltrans Intermodal Transportation Management System and the Pacific Maritime Association reports.

This trend of smaller, higher value shipments is fueling a change in the way goods are moved. Air cargo is expected to continue to be the fastest growing segment of freight transportation nationally. In the Southern California area alone, air cargo is expected to increase from 3 million tons to almost 9 million tons (1994-2020). The growth in air cargo is stimulated by the emergence of just-in-time business inventory practices that eliminate the need for large warehouse inventories.

The current modal shift in goods movement is expected to continue. Rail intermodal traffic is the second fastest growing segment of freight transportation, just behind air cargo. Truck transport will continue to grow, but at a slower rate than air cargo or rail intermodal. General rail transport will continue to be important, but is expected to grow the least of all modes.

As noted in the 1996 California Trade and Goods Movement Study, trends in population growth, manufacturing activity and foreign trade all point to a considerable expansion of movement of goods in California in the foreseeable future. The increase in population will require more food, clothing, and household goods; more homes, stores, and other buildings will have to be built; waste products have to be collected and transported to disposal points. All this involves an increased movement of goods, especially to and from urban areas.

California is at the nexus of international trade with the Pacific Rim, North America and Latin America. California's vital location is driving a globalization of California's economy. The state serves a diverse range of global trade, from the just-in-time delivery of Korean computer components, to the wintertime delivery of Chilean grapes to California or California almonds to Japan. In tomorrow's increasingly competitive global economy, goods movement must improve to support and facilitate California's continued well being.

CONSEQUENCES OF IMPLEMENTING GOODS MOVEMENT STRATEGY

The actions identified in the Goods Movement Strategy should improve the state's transportation system in a variety of ways. The number of traffic bottlenecks will be reduced, safety should be improved, congestion should be reduced, cooperation and coordination will be increased, and better information will be provided to customers and decision-makers.

At this point, it is difficult to quantify the consequences of implementing the goods movement strategy, since detailed scheduling, funding, and rigorous benefits/cost assessments still need to be analyzed. However, based on preliminary analysis to date, this goods movement strategy, as a collection of interdependent actions, will likely have positive, synergistic effects on the transportation system.

The goods movement strategy will employ and mainstream new technology improvements into the transportation system wherever appropriate. The package of new technology improvements includes advanced information, transportation management, and vehicle safety systems. New technology applications promise to improve the goods movement transportation system. Incident management programs provide positive benefits for the movement of goods, in some cases at a 3:1 benefit to cost ratio. Commercial fleet management could improve vehicle and driver productivity by up to 20 percent for local and long haul systems.

The bottom line is that in the future, every mode of transportation will be carrying more cargo. California's busy ports, airports, railroads, and highways will become even busier. The actions of the Goods Movement Strategy hold the promise of maintaining or improving mobility and safety; reducing costs of freight transport; benefiting the economy; and helping expand our partnerships and understanding of how the system works.

II. POLICIES, GOALS, OBJECTIVES

The Statewide Goods Movement Strategy is a strategic policy and action blueprint for improving the State's goods movement transportation system. Our intent is to improve existing system efficiency through new technology and other means, maximize system capacity and reliability, and minimize long-term transportation system costs. This strategy is based on a vision and commitment to the goods movement transportation system. It is based on a set of State guiding principles. Its goals and objectives set the direction for the specific long-term improvement of the goods movement transportation system. Its strategic policies are intended to serve as signposts in determining how goods movement transportation system improvements are to be undertaken.

A. Vision and Commitment

Under this general purpose, this strategy has a series of goals and objectives. But it starts with a vision:

- *The State's transportation system is a balanced, integrated, multimodal network…<and>*
- *Swift economic movement of goods through our ports throughout the State gives California businesses a competitive edge by adding value to their products and services.*

This vision is an excerpt from Caltrans' 1998 Strategic Plan. This document commits the State to a multimodal transportation network - streets and highways, a healthy freight rail industry, pipelines, airports and seaports - that supports the economic movement of goods which benefit California's economy. As a goal, the Strategic Plan further commits Caltrans to:

- *Maintain and improve mobility and access for people, **goods**, services, and information.*

This strategy is one element in fulfilling the Department's Strategic Plan by being an action blueprint for the planning, development, maintenance and management of an interregional, regional and local goods movement transportation system.

This vision also requires a commitment. Though currently a draft proposal, the following statement illustrates the Department's commitment to improving the goods movement transportation system:

- *Caltrans fosters the development of an integrated, multimodal goods movement transportation system that is safe, efficient and effective. It recognizes that this*

statewide system of highways, rail lines, air cargo facilities, and seaports is essential to a healthy economy and quality of life in California. It recognizes that goods movement must have full and appropriate consideration with people movement in the planning, design, funding, operation and maintenance of the State Transportation system.

The transportation system is developed in partnership with other State, federal, regional and local transportation agencies and the private sector. Caltrans works closely with regional and local agencies to ensure that goods movement needs are given appropriate emphasis and priority in regional transportation planning, programming and project selection.

B. Guiding Principles

The series of Guiding Principles were developed to guide the formation of the 1998 California Transportation Plan, including this specific strategy. They reflect how the State intends for the development of the transportation system to proceed in the providing for the movement of people, goods, services and information. The Guiding Principles commit the State to:

- Providing Californians with a predictable and reliable multimodal and intermodal transportation system that provides for the safe and efficient movement of people, goods, services and information.

- Managing the development, operation and maintenance of the transportation system to maximize safety, efficiency and cost-effectiveness at the lowest capital expenditure.

- Monitoring and evaluating the performance of the transportation system through the development and use of system performance indicators and goals.

- Focusing the State's initial effort on the High Emphasis Route corridors identified in the Caltrans' 1988 Interregional Transportation Strategic Plan (ITSP) - corridors that are critical to the State's economy.

- Pursuing transportation investments that provide the greatest opportunity for performance improvement. As part of the decision-making process, all alternatives will be subject to life-cycle benefit/cost analysis.

- Maximizing the use of new technology to manage and improve the system.

- Identifying and systematically removing physical and institutional barriers that adversely impact system performance, without compromising safety, environmental protection, or emission reduction efforts.

- Developing and managing the transportation system through a partnership that includes the State, federal, regional and local governments, Indian Tribal Governments, the private sector, and the general public.

C. Strategic Policies

With the Guiding Principles as the basis, the Strategic Policies are intended to serve as signposts in determining how goods movement transportation system improvements are to be undertaken. In practice, these policies are similar to the guiding principles. But the focus of these policies is on the decisions relating to the specific choices required to maintain and improve the goods movement transportation system. The Goods Movement Strategic Policies are:

- The State's multimodal goods movement transportation system shall be maintained and improved.

  Economic development is one of the vital interests of the State. California's trillion-dollar economy moves on the vehicles, craft and infrastructure of the goods movement transportation system. Thus, one of the State's primary interests is the maintenance and improvement of this system - the highways, rail lines, airports, seaports, border crossings, and intermodal centers that make up the goods movement transportation system.

- Goods movement must be given full and appropriate consideration in the planning, design, development, operation, maintenance, and funding of the State's transportation system at the State, regional and local level.

  The purpose of the State's transportation system is the movement of people, goods, services, and information. Goods and services movements are two vital elements within this purpose, yet historically they have not always been given reasonable, adequate, and comparable consideration. This policy does not necessarily advocate equal funding. But it does advocate those goods movement issues and responses be given consideration appropriate to significance of the transportation issues in question.

- The State shall participate, to the extent allowed by law, in the planning, developing, and funding of each modal component of the transportation system, including highways, rail lines, airports, seaports, pipelines, space launch and recovery facilities, intermodal terminals and border crossings.

The State's goods movement system is an interconnected, multimodal transportation network. However, each network piece has multiple, quite often disaggregated, public and private components, often with multiple owners and/or operators. Changes to these components effect other modes and operators, particularly when considering access issues. All these system elements must work together to serve the public interest and contribute to the State's economy. Thus, the statewide public interest can only be served by the State participating in the planning and development of these systems, particularly in regards to access.

- The State must have the financial and technical flexibility, to the extent allowed by law, to respond to transportation problems that are in the public interest, regardless of facility or mode.

  State transportation network issues are frequently multimodal in nature, and involve both public and private operations. In maintaining the State's economy, where there is a potential significant long-term public benefit by its involvement, the State should have the ability to respond both technically and financially, regardless of mode. This includes the maintenance of system components, modal options, and regional access.

- The State shall take a long-term approach in planning and investing in California's transportation system for the next generation.

  California will significantly grow over the next 20 years, in population, jobs, economic activity, and goods movement volumes. Immediate steps to improve system operations are wise and appropriate. But to be able to accommodate these increases in the future, a long-term approach to the planning and development of the system must be taken.

- Statewide system investments should initially be focused on those interregional corridors and facilities that carry and handle the primary share of goods movement today and into the near term.

  With the competition for scarce financial resources, the State must focus its efforts where the biggest payoff can be achieved in terms of system improvement. It must also focus its efforts where the connections to statewide (versus regional or local) interests are strongest in terms of the international, interstate, and interregional movement of goods. This strategy recommends that the interregional high emphasis routes, corridors, gateways, and facilities, as identified in Caltrans 1998 Interregional Transportation Strategic Plan (ITSP), be that system of initial focus.

- The State recognizes that the feeder access network of highways, roads, branch and shortline rail lines, and smaller seaports and airports must also be maintained as fundamental components of the State's transportation system.

  This feeder access network is one of the fundamental elements of the State's transportation system. Regional and local interests, however, are in the best position to determine how these system elements can be maintained and improved. The State's interest is ensuring that the statewide interregional corridors and facilities, and the local feeder access network, function together as an integrated whole.

- The State shall maximize transportation system performance and system preservation by pursuing cost-effective new technology approaches and operational strategies.

  The State has a responsibility to preserve existing public infrastructure investment and maximize long-term public benefits. Thus, it must proceed by maintaining the existing infrastructure, by maximize existing system performance, and obtaining the maximum return on new investments. All proposed capital projects shall be subject to life-cycle benefit cost analysis. And it will monitor the performance of that system as a baseline for investment decision-making.

- State goods movement improvement efforts shall be customer based, customer focused, and customer responsive.

  The design of any goods movement improvement program must be based on customer understandings of the problems, and the joint ability, both of the public and private sector, to solve those problems. This must first include the private sector elements of the goods movement industry - trucking firms, railroads, air carriers, seaports, maritime firms, others. Other elements of private industry and governmental entities that play customer/stakeholder roles must also be involved. The best solutions will come from joint efforts that involve both the public and the private sector.

- The State shall work in close partnership with all levels of government and the private sector, and seek integrated, consensus solutions to transportation issues that enhance public safety, environmental resources, and quality of life.

  Goods movement transportation system issues cannot be resolved from a historical vantage point of separate agencies, with separate roles and responsibilities, which in turn are removed from the workings of the private

sector. If the system is to be optimized, then the solutions must be developed through an interdependent and integrated process that goes beyond traditional roles and responsibilities. It also requires acknowledgment of the needs at each level - from economic development and need for interregional travel, to livable communities. The private sector must see their involvement, not only as the users of the system, but also as possessors of many of the solutions. So the State must work in close partnership with all parties involved in resolving goods movement transportation issues. It must seek by its participation the maximization of local involvement and consensus building, and the identification and implementation of actions that enhance public safety, environmental resources, and quality of life.

D. Goals, Objectives, and Performance Indicators

From the policy basis noted above, the following are this strategy's goals and objectives. These goals and objectives are designed to be responsive to the issues identified by our partners, including the goods movement industry, in identifying ways to maintain and improve the goods movement transportation system. They were also developed in recognition of the 1997 National Freight Policy. Although a certain mode may be mentioned, policy and action responses to these goals are intentionally multimodal in nature. Performance indicators are listed. However, they are tentative at this time until the elements of the State's transportation system performance measure system are identified. The strategy's goals, objectives and related performance indicators are:

Goal 1: Enhance California's economic vitality by improving multimodal access and mobility for goods.

Comment: This goal deals with the ability of California business in general, and its transportation industry in particular, to compete on the national and international level with other firms, states and nations. Actions would be included only if they are expected to result in increased California jobs, improved services, and a better quality of life.

1. Objective: Reduce nonrecurrent delay due to accidents and other incidents.

   Performance Indicator: Annual hours of nonrecurrent delay due to accidents and other incidents.

   Comment: Predictability and reliability are key in the goods movement industry today, as more businesses use "just-in-time" operational practices. As a result, unpredictable delay is a significant

performance concern. Safety has also been continuously identified as one of the State's highest priorities and concerns. This multimodal objective attempts to address these issues.

2. Objective: Reduce recurrent delay on the transportation system.

   Performance Indicator: Annual hours of recurrent delay due to congestion.

   Comment: Congestion affects to some degree all transportation modes. Our partners have identified highway congestion and resultant delay, however, as the number one transportation problem. Congestion increases average trip times, which increases the cost of doing business.

3. Objective: Reduce the number of transportation system miles and facilities requiring immediate rehabilitation.

   Performance Indicator: Number of high emphasis route highway lane miles requiring immediate rehabilitation.

   Comment: Infrastructure preservation is a high priority for both the State and regional agencies. Roadway deterioration is commonly cited in surveys as a major issue. It is reflective of facilities that have exceeded their design life, have outdated geometrics and/or use at levels beyond their original design parameters. Similar issues for exists for the railroads, seaports and airports.

4. Objective: Reduce delays at California state and international borders.

   Performance Indicators: Average transit time for trucks/rail car/air cargo passage across the California/Mexico border. Average transit time for truck passage across California state borders.

   Comment: International carriers frequently cite the time required to cross the border with Mexico as a serious problem. This includes time required to clear U.S. Customs. The time required to cross the State's borders has also been a concern. This objective relates both to changes in regulatory processes and to the introduction of new technology/information systems to expedite cargo movement.

5. Objective: Improve intermodal access and connections between airports, seaports, border crossings, and rail, truck and intermodal terminals.

   Performance Indicator: To be developed.

   Comment: The ability of California's railroads, airports, and seaports to compete depends on adequate access and complete and efficient connections. This objective relates to enhancing the goods movement industry's ability to efficiently handle both domestic and international cargoes.

6. Objective: Reduce physical, operating and regulatory impediments.

   Performance Indicator: To be developed.

   Comment: Much progress has been made in reducing both the federal and State regulatory burdens on the goods movement industry. However, additional improvements can be made, particularly in the areas of environmental assessment and permitting, inspection, and credentialing.

   This strategy also continues State support of efforts to reduce NOx and particulate emissions, consistent with California's federally mandated State Implementation Plan (SIP), that respects both environmental objectives and the economic role and interests of the goods movement industry.

Goal 2: Develop and manage the transportation system based on explicit understanding of system performance and customer expectations.

Comment: To improve the goods movement transportation system appropriately, technical tools, information, and partnerships are required for a successful strategy to be designed and implemented. This goal deals with developing and maintaining the systems and relationships that makes progress possible.

1. Objective: Develop improved analysis tools and information to support evaluation of goods movement transportation system performance, improvement alternatives, and community and other significant impacts.

   Performance Indicator: To be developed.

Comment: Sophisticated analysis tools, and reliable and sufficient information, are fundamental to State and regions' ability to perform goods movement planning, assess system performance, analyze improvement alternatives, and evaluate community and other impacts. This capability is essential in making informed decisions regarding appropriate transportation goals, improvements, and funding.

2. Objective: Expand and strengthen partnerships between the goods movement industry and the public sector.

   Performance Indicator: Number of California Metropolitan Planning Organizations (MPOs) with active freight advisory councils or equivalent forums.

   Comment: Improvement of the goods movement system can occur only if there is an open, active and continuing dialogue regarding both problems and solutions between the goods movement industry and the public sector. Improved dialogue between the State, federal, regional and local governments is also required if goods movement issues are to be resolved.

III. SYSTEM DESCRIPTION AND ISSUES INVENTORY

California's goods movement transportation system is a multimodal network of highways, rail lines, seaports, airports, pipelines, space launch and recovery facilities, intermodal terminals, and international border crossings. There is high demand on this system, resulting in various problems and issues. This demand is expected to increase significantly in the coming years. In part due to this demand, this system is experiencing various problems and issues. To effectively develop and improve the system, this chapter first introduces the system and describes system demands, problems and issues. It then outlines the strategy's system priority recommendations. Finally, it outlines the existing roles and responsibilities of various governmental organizations involved in its development and operation.

A. SYSTEM DESCRIPTION

The California goods movement transportation system is a multimodal network of highways, rail lines, seaports, airports, pipelines, intermodal terminals and international border crossings. California progress, quality of life and economy are in part the result of, and dependent upon, the efficient movement of goods on this system. But specifically, what makes up this system? What are its components? This report section attempts to answer those questions.

1. Highways (Truck Movements)

The California State Highway System is made up of 15,158 miles of roadway; 2,292 miles (15 percent) are Interstate highway, and the remaining 12,866 miles are federal-aid highway. The estimated vehicle miles traveled in 1995 was 146 billion miles. The total number of registered automobiles was 17.3 million, and the total number of registered commercial vehicles was 5.5 million.

Caltrans has full responsibility for the network of non-urban highways known as the Interregional Road System (IRRS). The Legislature identified this system by statute in 1989. It serves the interregional movement of people and goods. It originally included 81 state highway routes (or portions of routes) out of the 249 routes of the State Highway System. Six additional routes (or portions of routes) have been added to the system by legislation since that time.

Interstate 5, stretching from Blaine, Washington on the Canadian border, to San Ysidro, California on the Mexican border, is an important North American Free Trade Agreement (NAFTA) route. Interstate 10, from Los Angeles to Jacksonville, Florida connects Southern California with the Gulf Coast and the Southeast. Interstate 80 from San Francisco to New York provides an integral

link between Northern California, the nation's heartland and the industrial Northeast.

Truck volumes have increased proportionally with the growth of the state. However, in certain areas, truck traffic has become a larger component of the traffic mix. This is especially true on certain interstate routes in rural areas, and roadways that provide access to seaport complexes, intermodal terminals, and border crossings. With the growth of the State, this trend is expected to continue.

2. Rail

California is served by two major "Class I" railroads, the Burlington Northern Santa Fe (BNSF) and the Union Pacific (UP)[2]. It is also served by some 27 short line operations throughout the State that serve as connectors to the major railroads, harbor areas, and intermodal terminals; that provide service to agricultural and warehousing areas, and timber and resource industries.

The Burlington Northern Santa Fe Railway Company owns and operates more than 31,000 route miles covering 27 states and two Canadian provinces. This network covers the western two-thirds of the United States, stretching from major Pacific Northwest and Southern California ports to the Midwest, Southeast and Southwest, and from the Gulf of Mexico to Canada.

In California, BNSF operates 1,300 miles of track providing rail service along the I-5, I-80 and I-40 corridors. The railroad serves the rich agricultural Central Valley as well as the Ports of Los Angeles, Long Beach, San Diego, Oakland and Richmond. Forty percent of BNSF's California freight is intermodal containers and trailers. BNSF handles import-export automobile traffic at San Diego, Los Angeles and Richmond. Wine and agricultural products from the Central Valley are carried outbound by BNSF trains.

The Union Pacific Railroad is the largest railroad in North America, operating over 32,000 miles of track in 23 western states, linking every major West Coast and Gulf Coast port. It is the primary rail connection between the U.S. and Mexico and interchanges traffic with Canada as well.

In California, Union Pacific operates on 3,898 miles of track and serves the rich agricultural Central Valley. UP also serves the Ports of San Francisco and Oakland in the San Francisco Bay area, and the Los Angeles metropolitan area with its two major ports at Los Angeles and Long Beach. In Northern California,

[2] Class I railroads have annual gross revenues of $250 million or more. Class II or regional railroads have annual gross revenues of more than $20 million, but less than $250 million. Class III or shortline railroads have annual gross revenue of less than $20 million. These limits are updated annually to reflect inflation.

Union Pacific handles import-export automobile traffic at Milpitas, Fremont, Benicia and Oakland. Fruits, vegetables and canned goods from the Central Valley are carried outbound on UP trains.

Shortline railroads provide an important link in the statewide goods movement transportation system. Operated by small entrepreneurs with lower overhead and more direct customer service than the larger Class I railroads, shortline railroads provide for the movement of goods from rural areas to domestic and international markets. By providing rail service to shippers affected by Class I branch line abandonments, shortline railroads are making significant contributions to the record volume of rail traffic being handled by the railroad industry in recent years. These small railroads have been very successful in diverting truck traffic off the state highway system, thereby helping to relieve some of the congestion.

There are 27 shortline railroads operating over 1,700 miles of track in California. Shortline railroads provide service to some very remote parts of the state who otherwise would not have any other alternative than to use trucks. The number of track miles operated by shortline railroads has more than tripled since 1980 and this trend is expected to continue into the next century.

3. Airports

The air cargo industry predominately carries high value goods, such as electronic equipment, perishable items and emergency shipments among other time sensitive items. California's major air cargo facilities are located in Los Angeles, San Francisco, Oakland and Ontario.

Los Angeles International Airport (LAX) is the third busiest cargo airport in the world, handling more than 1.5 million metric tons of cargo in 1994. San Francisco International Airport (SFO) is the eleventh busiest cargo airport in the United States and the nineteenth busiest in the world. In 1994, SFO handled over 687,000 metric tons of air cargo. Oakland International Airport (OAK) is the third busiest airport for air cargo in California, handling over 497,000 metric tons in 1994. Ontario International Airport (ONT) is the fourth busiest air cargo airport in California and second busiest in Southern California handling over 345,000 metric tons.

Los Angeles International, San Francisco International, Oakland International and Long Beach Airports are all in a position to directly benefit from the expansion in trade with the Pacific Rim. However, with the new longer range aircraft coming on line, airports in Arizona or Nevada are also in a position

to benefit from the increase in trade with the Pacific Rim. Thus, California will have to compete with other states to continue as the West Coast trade center.

4. Seaports

Ports are a vital link in the transportation network, as well as an important part of both the State and nation's economy. The Los Angeles/Long Beach ports complex and the San Francisco Bay seaports are gateways for the growing waterborne Pacific Rim trade. The ports provide direct and indirect employment and other benefits in the region and statewide. There are 11 major publicly operated seaports, and three privately operated seaport areas in the state. In 1995 these ports handled over 130 million tons of dry cargo, and additional tonnage in liquid cargo (especially petroleum products).

To succeed in the rapidly changing maritime transportation world and take advantage of the expanding global marketplace, California seaports are having to respond to several issues and challenges. These are:

- Growing International Trade and Bigger Vessels: California is the gateway for trade with the Pacific Rim. Imports and exports are increasing and large cargo volumes emanating from the Pacific Rim nations are resulting in carriers putting more large capacity vessels into service. These types of vessels need larger berths, faster and larger cranes and more support facilities. Only those ports that can find the funds for extensive capital expenditures to modernize will be able to receive them. Larger vessels and more traffic in the harbor also indicates a need for deeper channels, harbor improvements and more sophisticated navigation aids to be provided by the federal government

- Intermodal Connections: Ports are intermodal facilities. They interface between ocean and land transportation modes. The basic issue for ports is how quickly cargo can be moved from an ocean vessel to rail or truck or vice-versa. Port rail lines must be able to handle increases in freight; grade crossings will be impacted by more freight rail traffic; truck traffic may be caught in roadway congestion.

- Environmental Challenges: Dredging is necessary for both deepening the channels to accommodate the growing number of deeper draft vessels and for routine harbor maintenance. Dredged material must be disposed without major environmental harm. Wetland preservation is another environmental challenge that arises when ports want to expand. Mitigation must be found before expansion involving wetlands is approved.

- Competition for Waterfront Land - In order to modernize and expand their terminals and to improve intermodal connections, many ports will need additional land. Ports must compete with commercial real estate developers for the decreasing amount of waterfront property.

- Legislative and Funding Challenges: California public ports are generally under the direction of port authorities, which may be organized as either special districts, or as arms of the local city or county governments. Most public port entities endeavor to operate like a private business to generate revenues to pay operating and maintenance costs. Ports generally pay for new cargo handling facilities with a combination of their own revenues, local public funding, and bonds. Ports indicate that capital development and funding are the biggest challenges.

5. Pipelines

California's pipeline network consists of underground oil and gas pipelines that various petroleum firms own and operate. Connectivity of pipelines usually occurs with tankers at seaports and also at refineries. Pipelines transport large volumes of petroleum products that otherwise would have to travel on highways or rail lines. (For further information, see Section 6, pages 40-41 of the 1993 California Transportation Plan - Technical Addendum).

B. CURRENT AND PROJECTED DEMAND

California's seaports, airports, railroads and highways together move about one billion tons annually overseas, across the Canadian and Mexican borders, to and from other states and inside the state. This volume of freight traffic places a high demand upon the State's transportation system. Much of the freight traffic is due to California's geographical position. The state is strategically located to capture Pacific Rim trade. It is also situated between its second and third largest trading partners, Canada and Mexico. The lowering of trade barriers with these nations by NAFTA promises increased trade through California on a long-term basis.

Trucks carry roughly 600 million tons of goods moved within and through California. While truck transport occurs to some extent over the entire 168,000 miles of California's highways and roads, long-haul heavy truck travel is concentrated on the State's 7,513-mile portion of the National Highway System. On many routes, heavy trucks constitute a significant portion of all vehicles using the highway. Long haul trucks frequently must operate on roadways experiencing significant congestion (i.e., roadways with level-of-service (LOS) E or F).

Railroads carry about 100 million tons of goods annually. Most of this is interstate trade, since rail in generally only competitive with trucks on trip distances over 500 miles. The 1996 merger of the Burlington Northern and the Atchison, Topeka and Santa Fe, and the 1997 merger of the Union Pacific and the Southern Pacific changed rail operations in California. Both mergers promised reduced freight train congestion and providing shippers with more direct routes and faster service. However, these benefits have yet to be realized, in part to the significant growth in rail traffic. A significant consequence of this increased rail traffic, especially through urban areas, is the aggravation of safety and delay problems at unseparated, at-grade rail/highway crossings. This affects the efficiency of goods movement because of the lower rail operating speeds allowed, and due to blockages of truck traffic.

Air cargo is another contributor to the demand on California's goods movement system. The State's major airports, Los Angeles, San Francisco and Oakland, handle 12.8 percent of the nations total air cargo tonnage. While this is only 3.5 million tons, it represents one-third of the value of all goods moved in the state. International air cargo shipped is expected to triple by the year 2010, and will account for about 80 percent of the total air cargo revenue ton-miles. The highest air freight market growth is expected to occur in the Orient to United States routes.

Because many types of California's manufactured products are becoming smaller and lighter, and as manufacturers are depending more on just-in-time delivery, the state's air freight traffic will increase as a percentage of the value of goods transported. Given that the existing airport capacity is insufficient to keep up with the rise in air traffic, California's airports will expand on a significant scale. This will aggravate the already serious airport access problems at major airports.

The state's seaports handle about 130 million dry tons of cargo a year and about 200 million total. California is the leading exporting state, with 16 percent of the nation's exports (as measured according to value) in 1994. It has 14 percent of the nation's imports. In 1993, the three major ports, Los Angeles, Long Beach, and Oakland together handled approximately 70 percent of U.S. West Coast seaport trade by value. They also moved 70 percent of all West Coast containers, measured in twenty foot equivalent units (TEUs), in that same year. In only seven years, from 1985 to 1992, California's foreign trade increased from $68 billion to $147 billion. Most of this trade is with its top three trading partners, Japan, Canada and Mexico. California's major seaports are located in highly urbanized areas, and encounter significant socioeconomic and physical constraints in planning for expansion.

Long haul transport of freight from producer to final consumer by a single mode is rare in most industries. Typically, such goods movement involves at least two forms of transportation. The connection between two modes, at intermodal facilities, has

become more critical to efficient delivery of shipments. Intermodal facilities include seaports, airports, rail yards and freight distribution centers.

As noted in the "California Trade and Goods Movement Study", goods movement volume is expected to increase significantly over the next 20 years. Caltrans' Intermodal Transportation Management System (ITMS) used TRANSEARCH data to forecast commodity flows in and through California for the years 2002 through 2022. Using ITMS and industry figures, the actual volumes and 2012 forecasts are:

Mode	**1992**	**2012**
Truck Movements	586 million tons	769 million tons
Rail Carload and Intermodal	102 million tons	129 million tons
Maritime (imports/exports)	166 million tons	200 million tons
Air Cargo	4 million tons	12 million tons
Total	758 million tons	1,110 million tons

C. SYSTEM RECOMMENDATIONS

All components of the State's goods movement transportation system are important. The pickup and delivery of goods, to individual customers is vital, whether you are a major ocean container ship company at the Port of Long Beach, or a grocery store owner in June Lake. The key issue is, given the strategy's goals and objectives, given the limited resources and increasing demands, where should the State place its emphasis?

This strategy recommends that the 34 High Emphasis Routes, as identified in Caltrans' 1998 Interregional Transportation Strategic Plan (ITSP), be the initial system emphasized in this strategy. This includes a ten-route subset of these routes as the Department's focus (i.e., Focus routes). This strategy further recommends continued focus on a series of gateway routes through the main urban gateway regions, and on the State's Class I rail lines, major seaports and air cargo airports, as originally identified in the 1996 Intermodal Corridors of Economic Significance (ICES) report.

The ITSP is the foundation of Caltrans' programming recommendations for the Interregional Transportation Improvement Program (ITIP), as establish by SB 45 (Chapter 621, 1997 Statutes). The ITSP is intended to be updated every two years based on input and review by various State, MPO/RTPA, and local agencies, private sector representatives and other interested parties. SB 45 significantly changed the priorities and increases the flexibility the State has to propose transportation system improvements, particularly in nonurbanized areas. It requires that the 60 percent of the ITIP funds (15 percent of the State Transportation Improvement Program-STIP) be programmed by the California Transportation Commission (CTC), based on Caltrans recommendations, on these IRRS routes and on intercity passenger rail. The

remaining 40 percent (10 percent of the STIP) can be programmed by the CTC, based on Caltrans recommendations, on improvements that facilitate interregional movement of people and goods. Project types currently eligible for this latter category includes state highway improvements, intercity passenger rail, and grade separations.

From a goods movement perspective, the ITSP has five key objectives:

- Completion of a trunk system of higher standard State highways,
- Linking rural and smaller urban centers to the trunk system,
- Connecting urbanized centers and high growth areas to the trunk system,
- Connecting all urbanized areas, major metropolitan centers, and gateways to the freeway and expressway system to ensure a complete Statewide system for the highest volume and most critical trip movements, and
- Ensuring a dependable level of service for movement into and through major gateways of Statewide significance and ensure connectivity to key intermodal transfer facilities, seaports, air cargo terminals, and freight distribution centers.

The High Emphasis Route System recommended for emphasis in this strategy includes all of the State's nonurban interstate routes, as well as several key state highway interregional routes. All are key in the interregional movement of people and goods. Portions of the 10 corridors of the 34 High Emphasis Routes are termed "Focus Routes". Focus Routes are those routes that should have the highest priority for completion to minimum facility standards within the next 20 years. These routes are illustrated in Figure One.

The High Emphasis Routes, however, do not include the major interregional routes key to the movement of goods in and out of the major urban gateway regions of Los Angeles, San Francisco, and San Diego. Gateways are principal centers of major State, national, or international trade and commerce, goods movement and intermodal transfer of freight. They are also key passage ways into and out of the State or into critical geographic areas of the State. Nine gateways of major statewide significance will be primary areas for consideration of funding in the 10 percent category of the ITIP. Within the three gateway regions, 18 gateway routes were identified in the ICES effort. These example urban gateway routes are listed in Table One:

Table One

Major Urban Region Gateway Routes

Interstate Routes	US, State Routes
5	60
8	94 (I-5 to SR 125)
10 (Alameda Street to Arizona)	101

15
80
105 (LAX to I-710)
215
405
580 (from SR 238 to I-205)
710 (Ocean Blvd. to SR 60)
805
880

125 (I-8 to I-905)
125
238 (I-880 to I-580)

Figure One

Interregional Transportation Strategic Plan

The initial ICES nonhighway system elements identified for emphasis in this strategy are:

- Burlington Northern Santa Fe Railroad (high volume intercity corridors)
- Union Pacific Railroad (high volume intercity corridors)
- Alameda Corridor/Alameda Corridor East
- Los Angeles International Airport
- Oakland International Airport
- San Francisco International Airport
- Port of Long Beach
- Port of Los Angeles
- Port of Oakland

D. PROBLEMS AND ISSUES

Goods movement plays a vital role in making the California's economy strong. Yet it is also facing some of the biggest demands on its transportation system in the history of the state. In Southern California, vehicular traffic demand is resulting in congestion levels far beyond their original design capacities. Substantial increases of international cargoes are arriving at California's seaports and airports, and rail intermodal traffic volumes continue to rise. The challenges facing California's transportation system is illustrated by following statistics and trends:[3]

	1992	2012
California Population	31.3 million	43.6 million (+40%)
Vehicles In Use	21.5 million	30.3 million (+41%)
Gross State Product (1992 dollars)	$806 billion	$1.35 trillion (+67%)

Inadequate access and the lack of good transportation system that can move freight efficiently creates delays and higher costs for manufacturers, freight carriers and consumers. The recognition of the increasingly important relationship between timely delivery of goods and the State's economic health has led Caltrans and others to investigate freight issues in partnership with the various elements of the goods movement industry. Over the last few years, Caltrans, regional transportation agencies and others have worked to identify goods movement issues through surveys and discussions with industry representatives and other stakeholders. The issues listing highlighted here, and explored in fuller detail in Issue Paper #2, are the results of these surveys and analyses.

[3] Population estimates are based on California Department of Finance (DOF) projections. Gross State Product estimates comes also from DOF. Vehicles in use is projected by Caltrans based on Department of Motor Vehicle inventory data.

The solutions are even more problematic, because they can involve several alternative approaches: System modification and expansion; efficiency improvements; regulatory changes. The problems affecting the goods movement transportation system are grouped into the following issue categories:

- Capacity Constraints/Network Limitations
- Design Restrictions
- Operational Issues
- Safety and Maintenance
- New Technology Development and Implementation
- Funding, Programming, and Planning Constraints
- Policy, Regulatory and Institutional Restrictions

1. Capacity Constraints/Network Limitations

Congestion along the highway network is frequently cited as the number one issue. This issue has been compounded in recent years by the spreading of the "peak" demand period, where the facility demand exceeds available capacity over longer and longer periods of time. This in turn reduces the time window in which truck operations can occur outside of congestion. Traffic congestion also affects timely access to airports, seaports and other intermodal transfer facilities.

- Main-line highway congestion (e.g., Interstate 5, Los Angeles area).
- Congestion on main access routes, and at main highway access ramps to airports, seaports and other intermodal facilities.
- Lack of passing opportunities, especially on steep grades.
- Rail congestion, resulting in delays for both freight and passenger rail operations.
- Seaport/airport/intermodal terminal capacity constraints, due to growth and older or inadequate terminal designs and limited expansion options.
- Seaport/airport/intermodal terminal gate congestion.
- Lack of on-dock rail facilities at certain port complexes.
- Inadequate water channel depths.

2. Design Restrictions

These limitations are often reflective of older system segments that have not been updated to current design criteria or in response to increased system demands. Although much progress has been made, significant limitations still exist.

- Inadequate roadway and lane widths.
- Inadequate and/or restricted turning radius.

- Tunnel, overhead, and bridge height restrictions (both highway and rail).
- Bridge and roadway weight restrictions.
- Outdated highway and interchange designs.
- Declining ability to move and handle extra-legal sized permit loads and superloads. At present, no plan exists to protect and enhance such routes
- At-grade rail crossings along heavily used rail corridors.
- Hazardous material movement routing restrictions and limitations.
- Inadequate rail signaling systems.

3. Operational Issues

The growth of goods movement has also significantly impacted the operational aspects of the system. The lack of technological sophistication also affects the smooth, seamless operation of the system, and results in breakdowns of communications between system operators and users.

- Comprehensive and consistent roadway condition and incident information is lacking in many areas of the state.
- California lacks standardized signing of freeway ramps that would reflect distance or relationship to other exits (e.g., Exit 21).
- Information on California's system for movement of extra-legal loads is not well known and easily assessable.
- While subject of major local efforts, traffic signal synchronization along major conventional roadway goods movement routes is still a significant problem. Inadequate roadway signaling systems (e.g., no turn phases) is also an issue.
- Traffic delays at toll plazas.
- Limited operational hours at terminals and terminal gates.
- Rail congestion and bottlenecks around seaport terminals.
- Local airport noise restrictions that limit operations at many airports.
- Many airports and airlines give priority to passengers over air cargo operations, which restricts efficient air cargo operations.

4. Safety and Maintenance

Roadway deterioration, reflecting not only increased demands, but also system age, weathering and maintenance levels, affects both passenger and freight movement. Increased volumes of traffic also demands that safety considerations continue to be given high priority.

- Increasing number of highway system lane miles are requiring more extensive rehabilitation or reconstruction. This is due to highways reaching their original design life, vehicle loading beyond original design standards, and pavement failures due to subgrade failure due to moisture.

- Local roadway systems are experiencing similar rehabilitation needs. But for many rural, agricultural counties, funding for basic roadway maintenance, rehabilitation and reconstruction is severely lacking.
- Highway and local roadway deterioration levels are being impacted by both the weight and volume of heavy trucks.
- Excessive speeds by system users, both trucks and passenger vehicles, affect all users of the system.
- Differences in posted (and actual) vehicle speed limits for autos and trucks lead to operational conflicts.
- Expansion of user notification systems of adverse highway weather conditions are needed.
- Safe parking facilities for trucks, both inside and outside metropolitan areas and outside of intermodal terminals, is lacking.

5. New Technology Development and Implementation

New technology promises a bright future for improving the efficiency of the goods movement system. With the current system at capacity in many places, and with limited expansion opportunities, new technology will become more of a key tool in managing and in improving the efficiency of the existing transportation system. Automatic vehicle identification, global positioning systems, weigh in motion scales and electronic data interchange will all help to improve efficiency.

- Electronic Data Interchange (EDI) is rapidly being implemented by the larger long distance freight carriers. EDI provides real time information regarding the movement of goods through the supply chain. However, smaller firms have inadequate resources to invest in such technologies.
- Automated Vehicle Identification (AVI) is also becoming more common. AVI is used for the identification of vehicles for electronic toll collection and for bypasses of weigh stations/vehicle inspection stations on certain high-volume truck routes (such as on Interstates 5 and 10). However, there is a lack of adopted uniform national and international standards.
- Electronic train braking is a new technology that applies the brakes to all cars on a train with the same force at the same time, unlike existing air brake systems which applies brakes from the front to the rear of the train. Positive Train Control (PTC) is a high-tech train control system that uses computers, radios and receivers to monitor train movements and determine the location of a train at anytime. Both technologies promise improved safety and operational efficiency. However, technology cost, and required certification by the Federal Railroad Administration, may restrict their rapid deployment.
- Air quality standards may force the rapid introduction of new emission control technology, engine designs, and alternative fuels, without sufficient time for development and testing.

- Funding for maintenance and upgrading of equipment and computer software of weigh-in-motion facilities bypasses is inadequate.
- Global Positioning Systems (GPS) is improving truck tracking and is enabling rerouting trucks around congested areas. However, capital investment levels required remain high for small operators, and the impact on driver stress remains inadequately understood.
- Anti-lock truck brake systems remain an unrealized opportunity for improving truck operations safety.
- Implementation of commercial vehicle/international border enhancements can be hampered by institutional breakdowns between Federal, State and Mexican governments.
- Larger capacity and longer-range aircraft may result in air cargo carriers choosing airports outside of California for their overseas operations.
- Implementation of automation technology enhancements, including, navigation surveillance, weather prediction system improvements and air traffic controllers aids, is hampered by funding constraints.

6. Funding, Programming and Planning Constraints

Recently, several large public investments in goods movement projects, including public funds for the Alameda Corridor and international border projects, have been made. Nevertheless, the overall number of specific goods movement projects funded in recent years has been small. This is in part due to the lack of analytical tools, performance measures, and state and local decision-maker understanding of the needs of the goods movement transportation system. Despite the fact that the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) allowed for more flexibility in the funding of goods movement projects, there have been only minor changes in the types of projects that are being funded.

- Performance indicators that realistically reflect the performance of the goods movement system do not exist at the state or federal level.
- Descriptive and analytical tools for goods movement system analysis are far more limited than those for passenger vehicle movement. This includes tools to perform benefit-cost analysis of alternative goods movement projects.
- Reliable and accurate information on the type, volume and value of goods being transported is lacking. The evolving impacts of “just-in-time” delivery operations are also not fully known.
- Goods movement project funding is inadequate. In the competition for funds, passenger vehicle projects normally score ahead of goods movement projects. Goods movement projects are being programmed and implemented, but in many cases it is for passenger movement benefits, rather than those relating to goods movement. A more balanced consideration of goods movement projects in the programming process is needed.

- The construction of dedicated truck lanes is being proposed. Whether they should be funded through public sources, by the private sector through tolls or other means, through public/private partnerships, or through some combination of approaches needs to be explored.
- ISTEA did broaden the availability of federal transportation funds for goods movement projects, however, when mingled with State funds, restrictions apply which effectively limit the funds usage to highway applications.
- The lack of adequate grade crossing analyses, and the lack of local agency funding support, hampers the development of grade-separation projects along major rail corridors.
- Airports and seaports are restricted in their ability to use federal funds for off site projects to improve access to their own facilities.
- There is insufficient governmental/goods movement industry dialogue in problem identification, analysis, and alternative action identification.

7. Policy, Regulatory and Institutional Restrictions

Issues in this category fall into two broad groupings. The first area deals with the lack of visible support for goods movement analysis and investment (this is also addressed under Planning immediately above). The second group covers regulations designed to limit environmental or safety impacts.

This goods movement strategy recognizes that air quality is a very important issue for transportation in California. An important part of the California Statewide Implementation Plan (SIP) includes mobile source emission reductions. This strategy acknowledges that the goods movement sector has to participate in helping to achieve those emissions reductions. But it also calls for the recognition of the economic investment made and the resources available to the goods movement industry for new equipment and technology. Through the implementation of this strategy, specific actions will be identified and implemented that integrate improved transportation system operations, positive economic impacts, and air pollution reduction benefits.

- Changes in truck size and weight continue to be proposed. The issue involves balancing economic efficiency with roadway impacts and safety considerations.
- Commercial vehicle registration in California is an involved, cumbersome, multi-agency process.
- New air quality standards for trucks, railroad locomotives and aircraft may significantly raise the cost of operations. Incentive programs need to be implemented to reduce impacts on small operators.
- Seaports and airports development requires extensive environmental analysis that take several years to complete. At times conflicts in different agency regulations lengthens this process.

- Goods movement is frequently not considered in local land use processes. This often results in lack of land for new or expanding intermodal facilities; inability to preserve landside access for future seaport expansion; and insufficient access and parking for building deliveries.
- At ports of entry, lengthy inspection/regulatory procedures (such as those of the U.S. Customs Service) and limited staffing results in shipment delays which inhibit the smooth flow of goods across the California/Mexico border.
- Some argue that State and regional agencies do not place enough emphasis on goods movement issues. With limited resources, the ability to do adequate goods movement planning analysis is often significantly restricted.

E. EXISTING ROLES AND RESPONSIBILITIES

The California transportation system involves federal, state, regional and local public agencies and the private sector with responsibilities in goods movement. In general, public agencies are charged with providing a safe, efficient and effective transportation system for goods movement. In theory, they work toward a common goal of ensuring that goods movement issues are addressed and transportation needs are met, while ensuring the optimum efficiency of the entire transportation network and the state economy. In practice, however, their roles and responsibilities are not coordinated, leading to conflicts and overlaps. This conflict is often due to fundamental conflicts in their goals, values and priorities...including the question of who benefits, and who pays. These conflicts are apparent in their interaction with private industry--both carriers and shippers--who provide and demand goods movement transportation services, and who use private and public transportation facilities.

Part of the process for improving the transportation system is defining goals, objectives and policies for improving goods movement transportation. Integral to that process is understanding who is responsible for what, and how those responsibilities can be modified to make the system work more smoothly and efficiently in accomplishing both public and private objectives.

1. Private Sector

The discussion of roles must start with the primary user of the transportation system: the private sector. The private sector is made up of a myriad of private businesses, which compete with each other in gaining and maintaining a share of the goods movement market and revenues. These businesses use the goods movement system, much of which is in public hands (highways, roadways), to deliver goods to their customers. Yet many elements of the system are also privately held (e.g., most railroads). Nevertheless the private sector is an important source of funding for the goods movement transportation system through various user fees and taxes.

By being the primary user and customer, and by being a major contributor of the user fees and taxes that are used to build and maintain the system, the private sector has a vital role in the goods movement system's development, operation, and support. The private sector is one of the customers that the public sector must serve in providing an efficient and effective transportation system. The private sector thus must also be an active partner with the public sector to ensure the continued vitality of the goods movement transportation system.

2. Public Sector

Over the last eight years discussion of government roles in goods movement has occurred in several arenas. Here in California they were addressed in the 1990 SCR 96 report, Improving Access to California Ports, the Caltrans-sponsored 1992 State Intermodal Goods Movement Conference, the 1994 report of the National Commission on Intermodal Transportation and the 1996 California Trade and Goods Movement Study. The Caltrans Statewide Intermodal Goods Movement Advisory Committee (SIGMAC) and the seven Metropolitan Planning Organization Regional Freight Advisory Councils also continue to address this issue as part of their ongoing examination of goods movement actors, issues, and solutions.

a. Federal, Regional, and Local Government Roles

Federal agencies with roles that affect goods movement include the U.S. Department of Transportation (US DOT), Department of Commerce (including U.S. Customs Service), and, and the U.S. Environmental Protection Agency (EPA). The US DOT includes the Federal Highways Administration (FHWA), Federal Aviation Administration (FAA), Federal Railroad Administration (FRA), and the National Highway Traffic Safety Administration (NHTSA).

Regional and local agencies in California have significant goods movement transportation roles. Regional agencies include Regional Transportation Planning Agencies (RTPAs), Metropolitan Planning Organizations (MPOs), Air Quality Management Districts (AQMDs), and Air Pollution Control Districts. The RTPAs and MPOs develop Regional Transportation Plans. Seven of the MPOs have created Regional Freight Advisory Councils to help improve the goods movement aspects of their Transportation Plans. Local agencies with goods movement roles include city and county planning, traffic, and public works departments. Local and regional special districts include seaports and airports. Regional agencies have the primary responsibility in responding to intraregional goods movement issues. Local agencies have the primary responsibility for local access issues. Yet all of these agencies must work together with the State and the

goods movement industry to adequately address interregional, intraregional, and local goods movement issues.

b. State Roles

State agencies with goods movement roles include the Business, Transportation and Housing Agency (BT&H), the Trade and Commerce Agency, and the Department of Food and Agriculture (for inspection of agricultural cargo). California departments under BT&H Agency that have major goods movement roles include the California Highway Patrol (CHP), the Department of Motor Vehicles (DMV) and the Department of Transportation (Caltrans).

Independent state commissions also have transportation responsibilities. The California Transportation Commission (CTC) programs transportation funds. The California Air Resources Board (ARB) regulates vehicle emissions and fuels, and the Board of Equalization collects transportation based fuel and use taxes. In 1996 Assembly Bill (AB) 1683 transferred most motor carrier responsibilities of the Public Utilities Commission to the CHP and DMV.

1) California Transportation Commission

The California Transportation Commission (CTC) is responsible for the programming and allocating funds for the construction of highway, passenger rail and transit improvements throughout California. The Commission advises and assists the Secretary of Business, Transportation, and Housing Agency and the Legislature in formulating and evaluating state policies and plans for California's transportation programs.

The following are some of the CTC's functions that are related to goods movement transportation:

- Adopting the State Transportation Improvement Program (STIP), including an estimate of State and Federal funds expected to be available for transportation projects and a set of projects prioritized in keeping with regional and statewide interests;
- Adopting capital improvement programs for highway, rail, aeronautics, toll bridge and enhancement projects;

- Allocating State funds for capital improvements to specific highway, toll bridge and aeronautics projects, with the constraint of available financial resources;
- Offering policy guidance to the Administration and Legislature by identifying key transportation system issues;
- Developing statewide guidelines for local and private sector financial participation in State transportation programs;
- Submitting to the Legislature an evaluation of the proposed budget of the California Department of Transportation, its adequacy for contributing to a balanced transportation program and the adequacy of current State transportation revenues; and
- Monitoring and reporting on the progress on implementation of transportation capital improvement programs.

2) California Highway Patrol (CHP)

The mission of the CHP is to ensure safety and provide service to the public using the highway transportation system and to assist local government during emergencies. CHP programs that affect goods movement include inspection, enforcement and service programs, such as the commercial enforcement program, the Freeway Service Patrol (FSP) program, the Cargo Theft Interdiction Program, as well as others.

The commercial enforcement program includes inspection of commercial vehicles, equipment, and terminals; enforcement of speed limits and driver operation requirements (including licensing and hours of operation); and the regulation of routes and transport hours for hazardous materials. The CHP Biennial Inspection of Terminals program inspects every commercial truck terminal in the state at least once every 25 months, including terminal maintenance records, drivers hours-of-service and license records, and random physical inspections of vehicles and equipment.

The CHP is lead agency for the Commercial Vehicle Information Systems and Networks (CVISN) project, a collection of information systems and communication networks that support commercial vehicle operations. It also coordinates FHWA's Motor Carrier Safety Assistance Program (MCSAP) to reduce commercial vehicle collisions and hazardous materials incidents by increasing enforcement. In July 1995, the CHP and Caltrans implemented a PrePass program that allows carriers with proven safety records and maintenance programs to bypass certain CHP weigh stations.

The CHP coordinates the statewide Cargo Theft Interdiction Program (CTIP) to reduce theft of commercial vehicles and cargoes. With Caltrans and

local authorities, the CHP also manages the FSP program of roving tow trucks that remove disabled vehicles on urban freeways during commute periods. The CHP and Caltrans also co-manage the State Transportation Management Center (TMC) program that gathers information from CHP communications centers, FSPs, roadway loop detectors, closed circuit television, etc., and provides the information to the public to reduce congestion.

3) California Public Utilities Commission (PUC)

The PUC's transportation role is to promote public safety by ensuring that railroads and other regulated transportation providers operate safely, legally and in the public interest. Its regulatory role includes household goods and passenger carrier licensing, consumer protection, and railroad safety regulation, with oversight responsibilities for railroad safety and rail transit. The PUC is also the lead agency in representing the State's interests before the federal Surface Transportation Board on issues of railroad service, and in connection with railroad mergers and abandonments. The PUC also inspects railroads and rail transit systems in accordance with federal and state regulations and ensures that rail/highway at-grade crossings and separations are designed and maintained in accord with public safety standards. In 1996 Assembly Bill (AB) 1683 transferred regulatory authority over most motor freight carriers to the CHP and DMV.

4) Department of Motor Vehicles (DMV)

The DMV licenses drivers and vehicles. Licensing includes insurance verification, a role of concern to the goods movement industry. Under AB 1683 DMV's responsibilities now include verification of motor carrier liability, workers compensation insurance coverage and motor carrier registration.

5) Department of Transportation (Caltrans)

Caltrans is responsible for the planning, development and construction, operation, and maintenance of the State's multimodal transportation system.

Caltrans Headquarters Responsibilities

- The Deputy Director for Planning (DDP) sets the policy framework for the goods movement planning program, in light of overall Department policy. The DDP coordinates the Program's work with that of other programs to maximize achievement of the Department's overall transportation and goods movement goals. The DDP ensures that the statewide

transportation planning process is an intermodal effort that provides the basis for maintaining a safe, efficient and economical regional and statewide goods movement transportation system.

- The Transportation Planning Program (TPP) directs and manages the Department's multimodal goods movement planning effort. TPP is responsible for system planning that identifies current and projected goods movement transportation system demand and performance, system deficiencies, and associated transportation and economic trends. TPP advocates capital investments, operational improvements, and maintenance to overcome system deficiencies.

- The Aeronautics Program directs the California Aviation System Plan effort, which includes identification of air cargo flows and the analysis of ground access and airport/aviation system impacts.

- The Transportation System Information Program collects, analyzes and maintains goods movement information for use by the Department to support goods movement related activities.

- Design and Local Programs maintains project development procedures that support system integrity and intermodal connectivity.

- The Traffic Operations Program (TOP) works with the goods movement industry to facilitate safe, efficient and integrated truck operations as part of the multimodal State goods movement transportation system. TOP directs research, data collection, and operational activities to ensure that existing infrastructure is operated and maintained for maximum efficiency. TOP works with public and private sector interests in demonstrating and deploying commercial vehicle Intelligent Transportation Systems applications. TOP directs cooperative efforts to reduce and simplify trucking regulations using performance criteria, rather than prescriptive standards.

- The Rail Program focuses on intercity rail passenger service. Part of the mission of the Program is to improve the infrastructure of intercity rail passenger service in California. These infrastructure improvements have a complementary benefit to freight rail service.

- The Maintenance Program seeks to maintain, preserve, and protect the State Highway System, through the management of maintenance and rehabilitation needs assessment.

- The New Technology and Research Program fosters the identification, development, testing, demonstration and implementation of advanced transportation technologies. Through the efforts of the Program, goods movement will be aided by overall improvements in system efficiency and safety, and through improvements particular to goods movement.

Caltrans District Responsibilities

- District Directors work to ensure that adequate access and capacity for commercial freight operations are provided and maintained.

- District Division Chiefs for Planning and Public Transportation work with the goods movement industry and regional agencies to develop regional freight advisory committees and ensure that planning and programming documents address goods movement issues. These efforts rely heavily on System Planning and Regional Planning, Intergovernmental Program Review and Environmental Planning. District staffs work in partnership with regional and local governments, and private industry.

- District Division Chiefs for Maintenance and Operations work in partnership with regional and local agencies and the private sector to ensure that district maintenance and operations activities meet transportation needs at goods movement facilities.

3. Role and Responsibility Considerations

Changing the goods movement roles and responsibilities of government agencies and private industry raises several issues. The first is the State's overall role and responsibility for a multimodal transportation system. The issue of balancing State and regional roles in funding availability, allocation and decision-making includes balancing of public and private interests. The issue of regulatory burden, the efforts of the State to reduce it, and conflicts regarding governmental values and priorities versus private interest values and priorities must be addressed. These issues all raise the thorny question of who benefits, and who pays.

The balance question also involves the consideration of people movement versus goods movement. Should one purpose be given priority over another? Is it simply a question of addressing each transportation issue or problem on a case by case basis, or does it involve more?

Other questions must also be addressed. How extensively should the State be involved in the planning, development, operation, and maintenance of goods movement transportation? To what extent should the State be concerned with the

operation of private goods movement transportation within the state? Should Caltrans, for example, simply focus on the State highway system as part of its owner-operator responsibilities? And what role should the State play in assuring that freight rail services continue to be available to California businesses?

The different roles of state and regional agencies continue to change. As regional agencies have assumed greater transportation project decision-making responsibility the State focus has shifted more to interregional travel needs and goods movement though nationally significant airports, seaports, and international border crossings. These changes generate questions of funding balance and competition for available transport funding between the needs of people and the needs of goods movement. There is a concern that if funding of goods movement projects were increased, funding for projects serving people movement would be reduced. Economic analysis of long term costs and benefits of proposed transportation projects and programs is one way to address this issue.

At the local level balancing public and private priorities is often the most difficult issue. The goods movement industry has expressed concern over regulations that impede business and argue that local regulations do not adequately consider their needs for truck access, routing and time of day, loading, and parking, including overnight truck parking. Yet many of the regulations address citizen concerns about noise, safety, and potential blight.

Only through expanded dialogue between public agencies and the private sector will these role and responsibility issues be addressed.

IV. ACTION ALTERNATIVES INVENTORY AND EVALUATION

This chapter presents a series of actions identified that could be undertaken to improve the goods movement transportation system in California. It then presents an evaluation scheme for reviewing these actions in determining what actions should be given priority in improving system operations. Finally, it briefly reviews the current funding environment for goods movement projects.

A. ALTERNATIVE ACTIONS INVENTORY

This section presents action alternatives to improve the goods movement transportation system in California. The actions respond to the system issues identified in Chapter 3 and Issue Paper #1. The issue categories were:

1. Capacity Constraints/Network Limitations
2. Design Restrictions
3. Operational Issues
4. Maintenance and Safety
5. New Technology Development and Implementation
6. Funding, Programming, and Planning Constraints
7. Policy, Regulatory and Institutional Restrictions

The actions represent a range of complexity and planning horizons including those already being implemented, those now programmed, and those identified for future consideration. While many State-oriented actions are listed, a conscious attempt was made to include actions by the State's Metropolitan Planning Organizations (MPOs), Regional Transportation Planning Agencies (RTPAs), county transportation commissions, and local city and county governments. Under California's current planning and programming processes, those agencies have a major role in planning and funding specific goods movement projects.

This strategy presents an integrated approach that emphasizes cost-effective improvements, with an emphasis on applying new technology to improve system capacity, operations, and safety. In practice, the action groupings are a mix of approaches, from actions that address capacity needs and design limitations, to operational responses and planning actions. There has also been a conscious attempt to identify a full continuum of projects and actions, including those planned, programmed, funded, and implemented.

Issue Paper #7 should be consulted for an expanded discussion of the following actions.

1. Capacity Constraints/Network Development

Mobility and access are fundamental aspects of the transportation system. Traffic congestion and travel delay are identified as a primary problem by the goods movement industry.

The following five actions (and subactions) focus on capacity enhancement and network additions. With an emphasis on infrastructure planning and development, many of the specific projects will be traditional congestion relief projects that benefit both freight and passenger movement. But the actions include development of other modal options, as well. It is assumed that all infrastructure expansion projects will incorporate state-of-the-art technology and allow for advanced system optimization and management.

Action 1 - Develop the State Highway System

This action category includes congestion relief projects that benefit both freight and passenger movement. Projects in this category would develop the High Emphasis Routes identified in the Caltrans' 1998 Intermodal Transportation Strategic Plan, including focus routes (such as State Route 99), and gateway routes through major urban regions (such as Interstate 880). Analysis of new corridor needs would also be addressed under this category.

- **Action 1A - Prepare Major Investment Studies/Corridor Studies**
  Major Investment Studies (MIS) and corridor studies, with specific freight emphasis, should be prepared on the High Emphasis Route corridors and gateway routes. MIS are a method to identify corridor needs in urban areas, project alternatives, and environmental conditions that would be encountered in developing or expanding facilities. In rural areas, corridor studies are generally the first step in the project development process. They should also be prepared, as necessary, to evaluate new corridor needs.

- **Action 1B - Evaluate Truck-Only Facilities**
  Truck only facilities can address high volume goods movement demand and improve safety. The most extensive truck-only facility proposal to date is included in the Southern California Association of Governments (SCAG) 1998 Regional Transportation Plan. This proposal is for truck only facilities to be developed along several major corridors in the SCAG region, through a mix of public funds and tolls. Caltrans should work with SCAG, the County Transportation Commissions in Southern California and other interested parties to evaluate the feasibility of such facilities.

- **Action 1C - Improve and Rehabilitate Rural Highways**
  RTPAs, in cooperation with Caltrans, should identify improvement and rehabilitation needs of rural State highways and arterial roads to ensure that these roadways can handle the size, weight, speed, and volume of trucks. This action is particularly critical for roadways involved in the movement of agricultural goods. Rural roads are a key part of the goods movement system, but they are often ill-equipped to serve modern trucks.

- **Action 1D - Corridor Preservation**
  To ensure that facilities can expand in future years, right-of-way for that expansion should be preserved or acquired.

- **Action 1E - Develop Automated Highway System Application**
  Automated Highway System (AHS) applications for goods movement should be developed. AHS can add capacity without the need for physical infrastructure expansion. For example, platooning truck caravans with the AHS may increase efficiencies.

Action 2 - Rail System Improvement

- **Action 2A - Rail System Improvement**
  Caltrans should identify and plan rail projects to significantly reduce highway congestion, enhance economic development, improve public safety, and improve rail operation speeds and access, both in urban and rural areas. Improvements to the rail system can benefit the public by encouraging long-haul truck shipments to move by rail. The Alameda Corridor, in Southern California, is a nationally known rail consolidation project and dedicated freight corridor that will reduce truck volumes in the short term, on Interstate 710 and other Los Angeles highways.

- **Action 2B - Expand Development of Grade Separations**
  Regions, in cooperation with Caltrans and other interests, should expand the identification and implementation of railroad/roadway grade separation projects along high-volume freight corridors. The most positive impacts from grade separation projects are those coordinated along an entire rail corridor.

- **Action 2C - High Speed Rail System Planning**
  The State, in cooperation with regional and local agencies should continue development of the high-speed rail (HSR) system in California for both passenger and high-value, time-sensitive parcel movement.

Action 3 - Expand Border Infrastructure

Federal, State, and regional agencies should continue to expand and improve the physical infrastructure at the California/Mexico international border. This development is Caltrans' identified NAFTA Net of facilities that include needs for new and expanded border crossings, inspection stations, access routes, and border area support facilities.

Action 4 - Facilitate Intermodal Terminal Development

Caltrans and regional agencies should assist in the planning, developing and funding of intermodal terminals. Such terminals provide greater intermodal access and system efficiency in the interchange of freight between modes. One example is the $154 million Joint Intermodal Terminal (JIT) at the Port of Oakland that needs additional funding for full implementation.

Action 5 - Expand Air Cargo and Seaport Facilities

Caltrans and regional agencies should assist California airports and seaports in converting former military installations to state-of-the art international trade terminals. Regional Transportation Planning Agencies (RTPAs) should take a more active role in airport planning, particularly the development and integration of ground access roadways, rail facilities, and intermodal transfer facilities.

2. Design Restrictions/Network Improvements

California is ahead of many states in eliminating roadway and rail line operational restrictions. The geometric design of many non-interstate roadways and some older interstate route sections, however, do not meet current design criteria, or need to be upgraded to meet increased system demands that have developed since the facilities were first constructed.

Following passage of the Surface Transportation Assistance Act of 1982, California identified those state highway routes on which larger trucks can safely operate and where there are operational restrictions. The restrictions are being replaced, in many cases, through the development of relatively low-cost improvements. Truck access is being improved by low-cost improvements funded from the State Highway Operation and Protection Plan (SHOPP), such as new signals, improved signal timing, turn pockets, and wider shoulders. But the movement of extra-legal loads remains a significant issue. This section presents four actions to reduce restrictions that impede goods movement.

Action 1 - Identify System Design Restrictions Which Impede Goods Movement

Caltrans, RTPAs and the private sector, through freight advisory councils or other forums, should identify restrictions on the safe and efficient movement of trucks and identify improvements to resolve these restrictions.

Action 2 - Review Design Standards for Roadway Structures and Pavements

Caltrans should review its design standards for structures and pavements to assure that they reflect the impact of heavier vehicles and higher volumes. The standards should be revised to extend the design life of structures and pavements.

Action 3 - Improve Access Control

Caltrans should evaluate the placement of access and egress points to freeways and roadways, and review new development proposals to balance access requirements and roadway utility.

Action 4 - Identify California's Extra-Legal Load Network

Caltrans, in cooperation with MPOs/RTPAs and private industry, shall identify and address the existing and projected corridors, routes, and facilities and demands for the movement of extra-legal permit loads. This study should examine the current physical limitations to such moves, and the possible actions that the State, the federal government, regional and local agencies, and the private sector should appropriately take to preserve this network.

3. Operational Improvements

Operational improvements can optimize the operating efficiency of a single mode, traffic in a corridor, or the entire transportation system. A generation of technology-based operational improvements now being mainstreamed into transportation operations fall under the umbrella of Intelligent Transportation Systems (ITS) that improve mobility, accessibility, reliability, intermodal connectivity, efficiency and safety. Nine actions are presented to improve goods movement operations.

Action 1 - Implement State and Regional Transportation Information and Management Systems

The following actions improve system operations by providing information and tools to monitor and control traffic operations.

- **Action 1A - Expand and Upgrade Regionwide Transportation Management Centers (TMCs)**

  The Caltrans/CHP Transportation Management Center Master Plan should be implemented. TMCs serve as hubs for the collection and dissemination of

real-time transportation information on traffic flow and delays, accident locations, construction activities, weather conditions, and other information.

- **Action 1B - Develop Smart Traveler Systems**
  Caltrans should continue development of "Smart Traveler" systems. These systems put the information available from TMCs and other travel information sources directly in the hands of system users. Trucking firms, for example, can use such systems to aid route selection and the scheduling of pick-ups, transfers, and deliveries.

Action 2 - Optimize Local Arterial System

Regional and local agencies should identify and implement relatively low-cost strategies and actions to optimize the local arterial system to serve goods movement. Traffic congestion on heavily traveled arterial streets, especially streets leading to seaports, airports and intermodal terminals can significantly impede goods movement. Many of these problems can be mitigated by low-cost improvements. This includes such actions as improving and synchronizing traffic signal timing, restriping, left-turn lanes, curve cuts, and improving signing and truck route designation.

Action 3 - Develop Border Operational Improvements

Caltrans and the CHP should continue to implement actions to facilitate the flow of goods across California's state and international borders. This includes working with other partners to reengineer the border crossing administrative process. Actions that could be taken includes electronic credentials and load documentation transfer, revised customs procedures, sophisticated inspection, monitoring, screening and detection devices, and improved access routes.

Action 4 - Improve Terminal Access

Regions and local entities should develop coordinated approaches to address airport and seaport terminal access, including actions to develop access roads, improve signaling, improve roadway geometrics and signage, extend terminal access hours, and develop remote access automated information systems.

Action 5 - Complete Implementation of Weigh Station Bypasses

Caltrans and the CHP should complete their program to develop Weigh Station Bypasses, using "PrePass" or similar program technology, and in-line weigh-in-motion (WIM) scales in order to reduce delay by allowing trucks to be weighed at highway speeds. The PrePass program involves periodic inspection of a vehicle and weighing of trucks at highway speed. Trucks participating in this program are equipped with a transponder and are electronically "tagged," allowing them to bypass inspection stations along their specified route.

Action 6 - Complete Implementation of Ramp Meters
Caltrans should complete the implementation of ramp meters. Ramp meters improve mainline traffic flow by regulating the flow of additional vehicles onto the highway, and are beneficial for trucks when sufficient ingress roadway is available to reach main-line roadway speeds.

Action 7- Standardize Exit Signing
Caltrans should investigate the feasibility and options of standardized exit signing that indicates distance along a route and relationship to other exits. Signing to commercial seaports should also be improved.

Action 8 - Fully Implement Electronic Toll Payment Services
Electronic toll payment services should be implemented on all State toll bridges upon the successful completion of the current State bridge electronic toll payment project. Electronic payment allows travelers to pay for transportation services such as tolls and parking, with electronic tags or cards, thus reducing traffic delay. The flexibility of such services allows alternative pricing strategies supporting environmentally sustainable and congestion management strategies.

Action 9 - Explore Congestion Management Techniques
Caltrans should develop additional congestion management techniques for goods movement applications, including perhaps congestion pricing or other incentives to encourage off-peak truck operations. The needs of both the shipper and the receiver must be considered, but it is the receiver generally that sets the time limit for cargo movement.

Action 10 - Examine/Facilitate Freight Rail Operations
Caltrans, the California Public Utilities Commission, seaports, the railroads and other interested parties should meet on a ongoing basis to identify and resolve freight rail operational issues that impact customer service levels, seaport operations, and commuter and intercity rail passenger services.

4. Safety and Maintenance Improvements

Projects that improve roadway safety will also improve system reliability. Improved maintenance allows increased operating speeds and fewer accidents, while reducing vehicle wear and cargo damage. Nine actions have been identified to address these issues.

Action 1 - Identify Safety Enhancements
RTPAs, through Regional Freight Advisory Councils, should identify actions that would improve transportation system user safety. This should include left-turn

lanes, passing lanes, roadway realignments and curve corrections, shoulder widening, median barriers and guardrails.

Action 2 - Enhance Safety Monitoring and Warning Devices

The CHP should increase radar enforcement along major rural highways, and explore the feasibility of using laser technology for speed enforcement. Caltrans should expand efforts to improve driver warnings of adverse weather conditions and appropriate operating speeds. The state should continue to support the demonstration and implementation of improved rail signaling systems.

Action 3 - Improve Grade Crossings Safety

Regions and local entities should identify grade crossings where improvements would increase safety, minimize or eliminate conflicts, and be cost-effective. Improvements in rail crossing technology include constant time warning devices, median barrier crossing protection and automated photo enforcement.

Action 4 - Extend Commercial Vehicle Inspection Station Operating Hours

The CHP should extend commercial vehicle inspection station operating hours to improve commercial vehicle safety and reduce road damage from overweight trucks. The public benefits should be balanced against the time impacts on the trucking industry.

Action 5 - Expand Roadside Rests

California should expand the number of rural roadside rests, including at multiuse sites and closed weigh stations. This should be part of a cooperative program with commercial developers. Roadside rests provide long-distance drivers a safe location for breaks, but the increased demand and relative scarcity of these areas has forced drivers to stop along roadways, at interchanges and in developed areas which are not compatible to truck stops.

Action 6 - Develop In-Route Parking Facilities

Caltrans, regional, and local agencies should pursue development of safe in-route parking facilities for trucks. Safe, in-route parking facilities are not usually available around seaports, international border crossings, and intermodal facilities in urban areas. Such facilities would improve driver and cargo safety and improve traffic flow near seaports and intermodal facilities.

Action 7 - Improve Hazardous Materials Information Systems

The National Highway Traffic Safety Administration, the California Public Utilities Commission, the CHP, Caltrans and private industry should jointly study the feasibility of, and develop if practical, a hazardous material incident

response system. It should provide safety officials with data on vehicle loads, route information, emergency telephone numbers and material handling procedures. As part of electronic cargo tracking systems, such a system should be coordinated with international tracking system development efforts underway by the Department of Commerce and the U.S. Environmental Protection Agency.

Action 8 – Develop Intelligent Vehicle Initiative

Caltrans should continue its involvement with the federal government's Intelligent Vehicle Initiative (IVI). This initiative involves the development of Advanced Vehicle Safety and Control Systems. From a goods movement perspective, these systems include Collision Avoidance Systems, Automated Roadside Safety Inspection, On-Board Safety Monitoring and Infrastructure Monitoring Systems.

Action 9 - Enhance High Emphasis Route Rehabilitation

Caltrans should work to reduce the backlog of pavement rehabilitation needs identified in the Caltrans 1995 State of the Pavement report. This includes movement toward the use of longer-life pavements. Maintenance activities are part of the State Highway Operation & Protection Program (SHOPP). The goods movement industry and regional agencies need to work with Caltrans to ensure that projects of interest to the goods movement industry are included.

5. New Technology Development and Implementation

Transportation technology helps goods movement to become ever more productive and efficient. Because new technologies can frequently yield greater profits, there is keen industry interest in the use of state-of-the-art technology. This interest has been fed by the logistics approach that is sweeping the industry, involving such actions as close scheduling of production, just-in-time transportation and deliveries, and real-time monitoring of shipment and vehicle locations to maximize asset utilization and reduce total costs.

A vast array of technological applications has already been implemented by the goods movement industry. Many are particular to one goods movement mode; others operate across modes. For example, Intelligent Transportation Systems (ITS) use advanced electronics and computer and information technologies to improve the performance of vehicles, transportation infrastructure, modes and systems. The essence of ITS involves system integration to yield greater productivity, connectivity, safety and environmental compatibility. Ramp metering and traffic signal optimization are just two samples of early ITS applications that are already deployed.

Other new transportation technologies are being developed, including alternative fuels, new pavements and other materials, and advanced highway maintenance. Innovations in logistics and transportation technology include satellite tracking; Global Positioning Systems (GPS); automatic equipment identification and monitoring; smart card and bar code technologies; electronic data interchange and logistics software; expert systems; and neural networks.

Successful application of new technology depends on its technical, economic and institutional feasibility. Many factors influence the success of deployment, including the organizational commitment and financial support, the need to be "mainstreamed" into planning, programming and funding processes, and the need for technical evaluation, comparison of relative benefits and costs, and consideration of the synergy that may yet be attained after full deployment. While some new technologies can easily be merged into existing systems, others will raise issues of compatibility. In some cases, existing legal, institutional and social frameworks will have to first change, a process that usually takes time.

In the development of this strategy, it was intended to emphasize the application of new technology. Several of the actions listed fall into this realm (e.g., Develop Smart Traveler Systems). However, for the introduction and application of new technology to take place, certain fundamental generic actions must be taken. These actions are identified below:

- **Continue Research and Development (R&D) of Technology**: This includes continuation of new technology research, development, testing, demonstration, and deployment. Such efforts need partnerships involving the public sector, industry, academia, and non-profit organizations, and include technology transfer activities.

- **Continue to Develop New Technology Standards and Protocols**: This includes such items as the National Transportation Communications for ITS Protocol (NTCIP), CVO standardization activities and Electronic Data Exchange (EDI).

- **Examine Legal, Institutional and Social Frameworks**: This includes the issue of the privacy of proprietary information.

- **Deploy the Core Foundation Intelligent Transportation Infrastructure (ITI)**: This includes the basic infrastructure components of the Intelligent Transportation Infrastructure (ITI) which form the defined "public component of ITS."

- **Expand ITS Applications to Support Intermodalism**: This requires full partnership consensus efforts, cost sharing, and exploration of ways to avoid intrusions on privacy. New technologies are already being used by goods movement companies to improve throughput, improve access to intermodal facilities, and optimize land use at intermodal ports.

- **Mainstream ITS**: ITS techniques need to be integrated into the planning, evaluation, programming and funding processes for transportation improvements.

- **Support Innovative Partnership Deployment**: The development of new technology requires innovative partnerships with the private sector and academia for development of technology to enhance provision of transportation services.

6. Funding, Programming and Planning Enhancements

Securing funding to support goods movement is a three-step process: identifying needs, ensuring funding flexibility, and pursuing additional funding.

Identifying system needs requires performance measures, analysis tools, and supporting data, as well as related planning and policy research. Ensuring the flexibility to use transportation funds for goods movement improvements is an essential step. Under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, it was not clear what types of goods movement projects were eligible for federal funds. This situation was not significantly changed by the Transportation Equity Act for the Twenty First Century (TEA-21). At the state level, the recently enacted SB 45 (Chapter 621, 1997 Statutes) revised the funding process for interregional goods movement, but it does not ensure State and regional funding for goods movement. The final step is to pursue additional funding.

This strategy is not meant to be a vehicle for public sector action to increase revenues. Rather, it is an agenda of what must be done, given State goals and objectives, to address the adequacy of funding for transportation system improvement and operation.

The following thirteen actions include funding, planning, policy and tools to support goods movement.

Action 1 - Revise Programming Guidelines to Address Goods Movement
Caltrans, the California Transportation Commission (CTC), RTPAs, and County Transportation Commissions should revise programming guidelines and

evaluation processes to give more equal consideration to goods movement project proposals such as mainline facilities, intermodal terminals, local arterials and ground access routes to seaports, airports, rail yards and border crossings. Requirements for Federal or State legislative relief, where statutory or constitutional provisions restrict available funding from goods movement projects, should be identified.

Action 2 - Develop Goods Movement Project Funding Guidebook

Caltrans should develop a guidebook for MPOs, RTPAs, industry and other parties to identify funding sources for goods movement projects. This guidebook should identify how project proponents can use the federal funds flexibility of TEA-21 for projects that would benefit goods movement. It should also identify, under the provisions of SB 45, how goods movement projects can be funded under state provisions. Such a guidebook should specific examples of projects that are eligible from constitutional, statutory, and regulatory standpoints.

Action 3 - Expand Public/Private Partnerships

Caltrans should develop additional avenues to expand public/private partnerships in the funding of transportation projects. The process for receiving private contributions and payments for projects has not always worked smoothly, with the notable exception of those "received" for local development impact mitigations. Other recent privately funded projects have been successfully demonstrated.

Action 4 - Explore Similarities Between People and Goods Movement Projects

Caltrans should identify the similarities and the cross-benefits of people and goods movement projects as a way to facilitate funding of goods movement projects. Goods movement projects can vary along a spectrum as shown in Table One in Issue Paper #7. Improvement projects that provide benefits to all or most transportation users are at one end of a spectrum, while those at the other end are dedicated improvements that benefit a small group of users. The more a project supports all transportation, the more likely it will be funded.

Action 5 - Advance Multistate and Multinational Transportation Planning

Caltrans should continue to participate in multistate and multinational transportation system planning efforts, such as the Western Transportation Trade Network Study, the Southwest Passage Corridor, and the Binational Transportation Study. These efforts lead to coordinated approaches in identifying system components, deficiencies, needed improvements, and coordinated development of interstate and international highway and rail corridors.

Action 6 - Prepare State Freight Rail Study

As part of its System Planning effort, Caltrans should prepare a State Freight Rail Study. It should develop an overall long-term approach to maintaining and improving freight rail system integrity, system performance, service availability, competition, and intermodal connections.

Action 7 - Develop a California Maritime Policy

The Business, Transportation and Housing (BT&H) Agency, in cooperation with California's seaports, is developing a maritime policy to set goals and objectives for the development and maintenance of the State's port facilities. Such a policy should build upon previous State and regional efforts, including the 1990 report Improving Access to California's Ports. (Note: A copy of that policy was completed during the development of this report and is now included as Appendix C).

Action 8 - Develop Goods Movement Local Accommodation and Impacts Guide

Caltrans, in consultation with both local government and goods movement industry representatives, should develop a guide to help communities accommodate goods movement. Access to business sites, and the impacts of goods movement operations, is a concern both to local planning officials and the goods movement industry. The guide should address general and community plans, zoning changes, land reserves, arterial development and roadway geometrics, off-street access, and parking for delivery vehicle requirements as part of the strategy to develop livable communities. It should also help the goods movement industry, local officials, and the general public estimate the goods movement impacts of new development.

Action 9 - Develop Goods Movement System Performance Measures

Caltrans, in cooperation with the goods movement industry and federal, regional and local agencies should continue the development of system performance measures and indicators to better gauge the performance of the transportation system and to evaluate projects.

Action 10 - Refine Caltrans Benefit/Cost Model

Caltrans has developed a life cycle benefit/cost model for the analysis of transportation projects. That model should be refined to allow analysis of goods movement projects, including ITS projects, both highway and non-highway.

Action 11 - Enhance Goods Movement Analysis Tools

The Department's Intermodal Transportation Management System (ITMS), currently being deployed, provides the ability to do a macro analysis of commodity movements. Various regional studies, such as the Southern California

Association of Government's recently completed Interregional Goods Movement Study, are additional resources for analyzing the transportation and economic impact of goods movement. These, however, are just the initial steps. Three specific actions need to be taken:

- **Action 11a - Enhance ITMS**
  The ITMS at a minimum should be further enhanced by the completion of a freight modal split analysis model, more discreet assignment of freight flows to specific corridors and routes, and expanded training of users in how to use the model to analyze goods movement system performance and alternatives.

- **Action 11b - Develop CASP Air Cargo Module**
  A specific air cargo module within the California Aviation System Plan needs to be developed and brought on-line. Such a module is needed to analyze and address air cargo growth trends (particularly of international movements), facility needs, land and noise restrictions, and integration with passenger services.

- **Action 11c - Continue MPO/RTPA Freight Element Model Development**
  Development of freight elements within the regional transportation models of MPOs/RTPAs should continue and be coordinated with efforts of Caltrans and other MPOs/RTPAs.

Action 12 - Improve Goods Movement DataBase

A Caltrans/regional agencies partnership effort should develop and regularly update a comprehensive and multimodal goods movement database. The partnership should include the State's economic and trade agencies. Both the Department and the regions have indicated that current data available on goods movement is limited. ITS technologies, however, may be one vehicle to obtain in a cost effective fashion real-time and predictive data for planning, modeling, forecasting, monitoring, and evaluation.

6. Policy, Regulatory and Institutional Changes

Efficient goods movement is vital to the State's economic interests. In recent years, considerable regulatory streamlining has taken place, but more remains to be done. The general public needs a greater understanding of goods movement issues and trends in the public sector. The following seven actions address those issues.

Action 1 - Develop CVISN

The Commercial Vehicle Information Systems and Networks (CVISN) demonstration project should be completed, evaluated, and if proven successful, fully implemented. CVISN is a partnership between USDOT, CHP, Caltrans, DMV, the State Board of Equalization, and the California Trucking Association. It will be an operational demonstration of the information system and communication networks that supports commercial vehicle operations, including electronic credentialing, commercial vehicle identification and safety verification, and electronic clearance at inspection facilities.

Action 2 - Streamline Commercial Vehicle Registration Process

A process by which a third party agent can act as an agent for commercial vehicle fleet transactions, similar to what auto clubs provide for passenger vehicle owners, should be implemented.

Action 3 - Foster Emission Reductions and Improved Freight Engine Technology

The State, together with the U.S. Environmental Protection Agency (EPA), the goods movement industry, and other parties, should continue cooperative efforts to reduce truck, rail, ship, and aircraft engine emissions, while minimizing the economic impacts on the goods movement industry and California's economy. Public-private partnership efforts, such as the Interstate Clean Transportation Corridor, the California Energy Commission's Heavy-Duty Truck Demonstration Program, EPA's rulemaking on locomotive emission standards, and the implementation of actions coming from the 1990 AB 2595 Technical Advisory Group on Heavy-Duty Truck Operations, should continue to be pursued.

Action 4 - Streamline Seaport Dredging Review

California should continue to encourage federal efforts to streamline the review and permitting process for port dredging projects. Agreements on the transfer of tidal lands from military base uses should continue.

Action 5 - Examine Public Funding of Publicly-Owned Transportation Facilities

The California Transportation Commission, in partnership with Caltrans, regional agencies, local governments, and private industry, should review the rationale for the distribution of transportation revenues between the State and local governments. This review should consider such changes as increasing urbanization and population growth, increased growth in truck weight and truck volumes, changes in roadway design criteria and pavement condition, and the impact of new Federal and State transportation law on local transportation system development. Current State law and regulations that restrict local government and private investment initiatives should also be examined.

Action 6 - Examine Rationale for Public Funding of Private Projects
Caltrans should examine the rationale for investing public funds in private goods movement transportation projects. This analysis should assess both the public and private benefits and costs of such public investments. It should identify how the public interest would be protected, and identify Federal and State laws and regulations that would restrict or limit such investment.

Action 7 - Amplify Caltrans Headquarters and District Communications
Communication on goods movement between the Caltrans headquarters and district offices and between districts and MPO/RTPAs should be improved. This would increase information dispersal and understanding of goods movement transportation issues and develop more coordinated agency actions. Caltrans representatives should participate in all Regional Freight Advisory Councils (RFACs) meetings and/or similar forums that address goods movement issues.

Action 8 - Build Closer Working Relationships With Industry Representatives
Working relationships between the public sector and the goods movement industry should be enhanced. These relationships are vital if the issues affecting the movement of goods are to be understood and addressed. Continuing close working relationships through such forums as RFACs, the Statewide Intermodal Goods Movement Advisory Committee (SIGMAC), and periodic conferences are essential to an understanding of goods movement operations and trends.

B. ACTION EVALUATION METHODOLOGY

Transportation improvement projects, for the most part in California, have been funded as a primary benefit to the traveling public and tended to be highway related. Any benefits to the goods movement industry were of a secondary consideration, if even considered at all. As the goods movement industry and the traveling public increase their demands on California's transportation system, a new methodology needs to be developed to help get the most benefit from the limited amount of funding available for transportation. Such a methodology would include the consideration of outcome (results) desired, current system performance, and the evaluation of potential actions that could increase system performance.

Performance measures have been used in the past to evaluate the movement of people and vehicles, but not for the movement of goods. While some metropolitan planning agencies have begun developing performance measures, using modified people movement criteria for various specific modal projects, a system wide or corridor specific evaluation method has yet to be developed.

Freight transportation variables are much more complex than the variables affecting people movement decisions. Because commodities have many different priorities, values and shipping requirements, measurement and analysis is much more difficult.

Traffic engineers have traditionally used the ratio of volume to capacity (V/C) as a measure of how well the system is working. However, congestion conditions are poor performance measures when looking at different modes of transportation. Mobility, defined as "the ability to move people and goods quickly to the desired destination," needs to be added to the facility conditions observation to more accurately reflect the volume of people and goods as well as the speed in which they are being moved". Accessibility, defined as " the achievement of travel objectives within acceptable time limits", also needs to be added as a performance measure. Accessibility appears to be one of the best long-range performance indicators as it focuses on linking goods with their destination rather than the conditions of the system[4].

The Volpe National Transportation Systems Center, in their 1993 analysis of Intermodal Performance Standards, broke down the mass of possibilities for evaluation by choosing to categorize freight performance indicators into three groups:

- System Network Connectivity - access impediments, link capacity, safety and cross-modal transferability.

- Operational Indicators - productivity of the delivery process; economics of multimodal trade; and environmental efficiency in resource use.

- Facility Level Indicators - terminal accessibility, collection-delivery system capabilities and mode interchange efficiency.

As part of their November 1993 presentation before the "Integrating Transportation Management Systems into Transportation Planning and Operations" national conference, they concluded: "All three levels are essential to intermodal connectivity and the efficiency of the operations. For planning purposes, however,

[4] Pratt, Richard H., and Timothy J. Lomax, "Performance Measures for Multimodal Transportation Systems," presented at the 73rd Annual Meeting of the Transportation Research Board, Washington, DC, January 1994.

initial emphasis will be on indicators that identify network-level impediments, regulating facility or line haul operations to later stages of planning".[5]

Caltrans is developing performance-based criteria to monitor, evaluate and manage system performance as well as evaluate proposed actions outlined in the strategy. This effort is being formally conducted as the System Performance Module, a companion effort to this strategy, as part of an overall effort to develop the 1998 California Transportation Plan update.

In considering the actions proposed for inclusion in the strategy, a three part evaluation approach is proposed. These three parts are as follows:

- Responsiveness To Overall Strategy's Goals, Objectives, and Policies
- Impact On System Performance
- Technical Considerations

This evaluation approach will be used to assess the possible impacts of each action proposed. The end goal is the identification of a set of actions that would bring about the most positive change in system performance, and the most positive impact in achieving the strategy's goals and objectives.

1. Responsiveness To Overall Strategy's, Goals, Objectives, and Policies

The evaluation criteria proposed below builds upon the 1993 California Transportation Plan (CTP). The 1998 CTP update has as guiding principles the policy of maintaining a reliable, safe, and efficient multimodal goods movement transportation system by focusing state action on the needs of the direct users. It sets as a priority the maximizing of goods movement efficiency for the lowest capital expenditure by directing investments to those opportunities that present the greatest performance improvement, and by focusing the State's capital improvement efforts on the High Emphasis Routes identified in Caltrans 1998 Intermodal Transportation Strategic Plan's (ITSP). It sets as a mandate the management of the system through the development and use of performance measures.

Under the Statewide Goods Movement Strategy, two goals and eight objectives have been proposed. Some of these include reducing congestion and delay on the ITSP's High Emphasis Routes, enhancing California's economy by facilitating interstate and international goods movement; reducing nonrecurrent delay due to

[5] Norris, Bahar, Volpe National Transportation Systems Center, "Intermodal Performance Standards" Proceedings of Integrating Transportation Management Systems into Transportation Planning and Operations National Conference, Nashville, TN, November 1993.

incidents; improving access to intermodal terminals; expanding partnerships between the goods movement industry and the public sector; and developing improved information and analysis tools to enhance the goods movement transportation systems performance.

The overall question these factors are intended to address is, "Will these actions help achieve the CTP's and the strategy's goals and objectives?" The policy and objective factors proposed for this analysis are as follows:

- System Efficiency/Productivity: Will the action increase transportation system efficiency and productivity? Will it reduce delay?
- Safety: Will the action increase safety and reduce nonrecurrent delay?
- System Preservation: Will the action help preserve and protect public investment in transportation infrastructure?
- Life Cycle Analysis: Will the State's return on transportation investment increase by pursuing this action?
- Regulatory Burdens: Will the action reduce unnecessary regulatory barriers, procedures, or processes that affect goods movement?
- Economic Development: Will the action improve California's economy?
- Environmental Impact: Will the action positively or negatively affect the environment?
- System Evaluation: Will the action lead to improved understanding of system performance and enable more informed decision-making?
- Partnerships: Will the action enhance partnerships between the public and private sector in identifying and addressing goods movement issues?

2. Impact On System Performance

Overall, the second set of evaluation factors asks the question, "How will each of these actions improve the overall system performance?" Will it assist the State in achieving certain transportation system outcomes/results? Factors recommended for this review are the following:

- Mobility: Will the action expand capacity and improve the operating characteristics of the state's interregional transportation network? Will it reduce congestion and delay? Will it reduce overall trip times?

- Accessibility: Will the action expand travel mode choices? Will it improve intermodal connections to seaports, airports, rail, truck and intermodal terminals? Will it reduce mainline system access time?

- Predictability/Reliability: Will the action improve the predictability and reliability of the system?

- Safety/Operational Limitations: Will the action improve safety? Will it reduce or remove physical restrictions to goods movement, due to inadequate clearances or geometrics that create bottlenecks or force diversions?

3. Technical Considerations

Technical considerations relate to how an action might specifically affect localized performance of the system. One of the basic elements of Caltrans' project technical assessment process is life cycle benefit cost analysis (LCBCA). The LCBCA model estimates three types of benefits: Travel time (or delay) savings; safety benefits; and vehicle operating cost savings over 20 years. For rail projects the model measures train delay savings; public expenditure savings and highway user benefits due to reduced highway travel. The project benefits are compared three ways: 1) Net Present Value, which is the present value of total benefits minus costs; 2) Benefit Cost Ratio; and 3) Internal Rate of Return, which is an average annual rate of return (benefits) from the investment.

The development of system performance measures and project-specific criteria is an evolving area. The following project level indicators (and related outcomes) are recommended in the analysis of strategy's proposed actions:

	Indicator	Outcome Measure
1.	Traffic Volume/Congestion Levels (v/c); time lost to congestion (delay)	Mobility
2.	Capacity/Availability of Network or Facility	Mobility
3.	Ease of Access Within Acceptable Time Limits	Accessibility
4.	Ease of Transferring Cargo Between Modes	Intermodal Connectivity
5.	Level of Nonrecurrent Congestion (delay)	Reliability
6.	Accident Rate	Safety

7.	Environmental Impact	Environmental Quality
8.	Economic Development/Investment Opportunity	Economic Benefit
9.	System Owner/End User Costs	Economic Benefit

In general, Caltrans needs to establish a baseline set of indicators to determine how well the existing system is performing. Once established, these baseline indicators can be used to monitor the system's performance as well as determine which actions will provide the best return in terms of system benefits. This work will continue as part of the implementation of this strategy.

C. FUNDING SOURCES AND OPTIONS

Many important segments of California's highway system are experiencing a high degree of congestion. With respect to goods movement, this congestion can impair the competitiveness of the State's economy, its businesses in general and its freight industry in particular. New and expanded facilities will be needed along with the implementation of innovative operational strategies and new technology.

In conjunction with this congestion, California has, for several years at least, faced a funding shortfall that prevents it from meeting the State's transportation needs. Transportation revenue, whether it comes from Federal or State sources, is closely tied to the amount of fuel consumed and is not responsive to the California highway construction cost index. However, it is responsive to changes in the economy. As a result, available funding levels have increased as the economy has recovered.

Two recent legislative efforts, in different ways, is affecting this funding environment. On the Federal side, on June 10, 1998 the President signed the Transportation Equity Act for the 21st Century (known as TEA-21"). TEA-21 provides new federal authority and funding for highways, highway safety, transit and other surface transportation programs in California for Federal fiscal years 1998 through 2003. TEA-21 authorizes significant additional levels of funding for a wide array of transportation infrastructure projects in California for the next 6 years. For highway programs alone, preliminary estimates suggest the increase to California in the range of $870 million per year. Continued support for the research, development, operational testing, and deployment of Intelligent Transportation Systems is included, as well as funds for border improvements and high priority routes and trade corridors.

On the State side, SB 45 (Chapter 622, 1997 Statutes) did change the funding process significantly. However, no changes were made to the revenue side. As a result, the total amount of State funding otherwise available remains unchanged. But given the increased flexibility within SB 45, the amount of State funding going to goods movement projects may actually increases.

The various funding sources for goods movement projects is discussed below.

1. Federal Funding

a. Federal Funding Sources

Revenue from most of the 18.0 cents per gallon Federal tax on gasoline, 18.0 cents per gallon of diesel fuel, 4.4 to 8.9 cents a gallon on gasohol, and tire, truck and trailer sales and use taxes provided this State with an estimated two billion dollars in the 1996-97 fiscal year. This money is initially placed in the Highway Account of the Federal Highway Trust Fund. In California, it is then deposited into the State Highway Account.

b. Federal Funding Programs

ISTEA (and now TEA-21) is the primary source of Federal funds for surface transportation improvements. These Federal transportation acts contains various programs that finance goods movement projects. Highway oriented projects are by far the predominant type eligible for Federal funds. The eligibility for freight rail projects is relatively limited.

ISTEA placed a stronger emphasis on efficient goods movement and TEA-21 continues this emphasis. TEA-21 requires metropolitan planning organizations and the states to carry out a planning process that addresses:

- increasing the accessibility and mobility options available for people and **freight**; and
- enhancing the integration and connectivity of the transportation system, across and between modes, for people and **freight**.

TEA-21 also requires that freight shippers and providers of freight transportation services be given the opportunity to comment on the development of both transportation plans and programs. In practice, it requires that they be involved in the development of these products.

TEA-21 was intended to build upon the existing planning, programming, and funding structure outlined in ISTEA. Therefore, the basic funding programs established under ISTEA remain. These are discussed below.

1) Surface Transportation Program (STP)

The Federal Surface Transportation Program (STP) is the most flexible and largest Federal funding program. It provides money to the State (and the regions)

for construction, reconstruction, rehabilitation, resurfacing and operational improvements for highways, bridges and transit projects, including roadway improvements necessary to accommodate other modes. While this program emphasizes highway projects, Section 133 permits the funding of adjustments to highway facilities to accommodate rail lines. This includes lengthening or increased vertical clearances of bridges, adjusting drainage facilities, lighting, signing or utilities, or making minor adjustments to highway alignments.

2) National Highway System (NHS) Program

The National Highway System (NHS) program funds are available for a wide range of highway and highway related projects. This program funds most of the types of State Highway System improvements that benefit truck traffic. States can use NHS funds for rail transit projects where such projects are in the same corridor as, and in proximity to, a fully access controlled highway.

3) Congestion Mitigation and Air Quality (CMAQ) Program

Congestion Mitigation and Air Quality (CMAQ) funds are allocated to MPOs in air quality nonattainment regions, and to those former nonattainment regions that are now in compliance (i.e., maintenance areas), to fund projects and programs that would result in air emission reductions. In several cases in the nation, CMAQ funds have been used for both highway and rail improvements on the basis of the project's beneficial air quality impact.

4) Other Federal-Aid Highway Programs

Other sources of Federal money for transportation improvements that serve goods movement needs include Interstate System/Interstate Maintenance, Bridge Replacement and Rehabilitation, and Minimum Guarantee funding. A wide range of specific high priority demonstration projects is also included Funding shares are arranged to meet the objective of a 90.5 percent return of tax funds paid by each state into the Highway Trust Fund.

5) Aviation Funding

The Airport Improvement Program (AIP) is the primary source of Federal funds for aviation projects. Within the AIP there is a cargo entitlement category specifically for cargo improvements. These entitlements are distributed by the FAA on a formula basis based on activity levels.

2. State Funding

a. State Funding Sources

The State Highway Program is funded from essentially four different sources: Caltrans estimates that State excise taxes on gasoline and diesel fuel will provide $1.85 billion in revenue. Truck weight fees are expected to provide $635 million, and other revenues and reimbursements are estimated to provide $967 million. Federal sources (including Interstate Maintenance and National Highway System funding categories) were expected to provide $2.02 billion. However, this estimated amount was prior to the passage of TEA-21. Together these revenue sources are expected to provide a total of $5.47 billion to the State Highway Account.

b. State Funding Programs – SB 45

1) Introduction

SB 45 (Chapter 622, Statutes of 1997) significantly and fundamentally changed the funding sources and the process of programming (i.e., assigning) transportation revenues for projects which serve the State's transport needs. Senate Bill 45, which became effective on January 1, 1998 is designed to simplify the transportation programming process, establish greater responsibility and accountability for project delivery, and encourage transportation partnerships. It transforms the State Transportation Improvement Program (STIP) from a project delivery document to a resources management tool for transportation development.

Under SB 45, Caltrans retains its responsibility for the planning, design, construction, maintenance, rehabilitation, and operation of the State Highway System (SHS). The bill does not alter that responsibility.

Prior to SB 45, the California Transportation Commission (CTC) typically allocated STIP funds between Caltrans and the regional agencies at a ratio of roughly 25:75. SB 45 specifies that 25 percent of STIP funds are to be committed to the Interregional Improvement Program (IIP) and 75 percent to the Regional Improvement Program (RIP).

2) Consolidation

SB 45 consolidates various State funding programs into two broad programs that constitute the STIP. They are the Interregional Transportation Improvement Program (ITIP) and the Regional Transportation Improvement Program (RTIP). Caltrans is responsible for programming projects funded through the ITIP. Regional Transportation Planning Agencies (RTPAs) are

responsible for programming projects funded through the RTIP. Separately, Caltrans still prepares, and the CTC still adopts, the State Highway Operation and Protection Program (SHOPP) for the funding of maintenance, operational, safety, and rehabilitation projects. It is in turn based upon the 10-year State Highway System Rehabilitation Plan, newly required by SB 45.

3) Interregional (Transportation) Improvement Program

The Department funds its projects from the **funding program** called the "Interregional Improvement Program". The "Interregional *Transportation* Improvement Program" (ITIP) is the **document** which lists the Department's nominated projects. Caltrans nominates projects to the ITIP after consultation with regional and local transportation agencies, county transportation commissions and transportation authorities. The ITIP replaces the Department's Proposed STIP (PSTIP).

The ITIP consists of projects to improve State highways, the intercity passenger rail system, and projects to improve the interregional movement of people, vehicles, and goods. Eligible project types include conventional highway improvements, intercity rail, grade separations and mass transit guideway improvements. Projects in the ITIP must be consistent with the appropriate adopted Regional Transportation Plans.

SB 45 requires that Caltrans spend at least 60 percent of its ITIP funds (15 percent of the total STIP funds) for highway projects on statutory identified interregional routes outside urbanized areas and for intercity rail improvements. These are the Interregional Road System (IRRS) routes identified by statute on the State Highway System (generally those highway segments outside of urbanized regions). No less than 15 percent of this 60 percent portion of the ITIP funds must be spent on intercity rail. The 15 percent amount may include grade separations. Caltrans alone nominates intercity rail projects, while both Caltrans and the regions can nominate interregional road projects. This 60 percent portion of ITIP funds is not subject to the north-south split provisions.

From the remaining 40 percent of its ITIP funds (10 percent of the total STIP funds), Caltrans can propose to spend on highway improvements anywhere on the State Highway System (including urbanized areas), as well as for intercity passenger rail, grade separations, and mass transit projects. Caltrans alone nominates these projects. This portion of the ITIP funds is subject to the north-south split provisions.

Regions can propose substitute projects for the ITIP, however. The California Transportation Commission may include these projects if they determine that the replacement project is more cost effective than the project submitted by Caltrans.

4) Regional Transportation Improvement Program

Each regional transportation planning agency has the authority and responsibility under SB 45 to develop, in consultation with Caltrans, a Regional Transportation Improvement Program (RTIP) of projects within its jurisdiction. Projects within the RTIP are funded from the Regional Improvement Program. Regions may also included for information projects funded from other programs. Eligible RTIP projects include conventional improvements to state highways, grade separations, transportation system management and transportation demand management, soundwalls, rail transit, local street and road improvements, and passenger intermodal, pedestrian and bicycle facilities.

In general, the CTC must approve all RTIP projects selected by regional agencies in their RTIPs. If the Commission wants to reject one or more projects, it must reject the entire RTIP. It cannot simply reject a single project. The CTC can reject an RTIP only if it makes a finding that it is not consistent with the CTC's guidelines or is not a cost-effective expenditure of State funds. It can do so only after an objective analysis and a public hearing.

A regional agency may recommend a regional project to be financed with IIP funds that would otherwise be financed from RTIP funds. It must recommend the project separately from those in its RTIP. However, the regional project must be more cost effective than a project Caltrans has proposed in its ITIP.

5) State Transportation Improvement Program (STIP)

SB 45 changes the STIP from a seven-year to a four-year program, adopted biennially in even-numbered years. The 1998 STIP just adopted will be a six year transitional STIP. The subsequent four-year STIPs will be adopted by April 1 of even-numbered years.

A new project may not be included in either an RTIP or the ITIP without a complete project study report (PSR) or, for a project that is not on a State highway, a PSR equivalent or major investment study (MIS) prepared according to Federal transportation program guidelines. Caltrans and regional agencies shall consult with each other in the development of the ITIP and the RTIPs.

6) Implications

SB 45 makes various changes to the State's transportation funding process by consolidating programs, increasing the funding and programming authority of regional agencies, reducing the STIP period, reducing CTC discretion in project approval, revising fund distribution formulae, and other means. While SB 45's program consolidation provides both the State and regional agencies with greater flexibility in project selection, it does not provide any more latitude than previous law for transportation agencies to fund freight specific projects. Article XIX of the State Constitution still limits project types to highway and local road projects and fixed guideway facilities (see below). SB 45 contains no provision for funding freight rail, freight intermodal facilities, or other freight specific improvements This means that generally such projects as freight rail improvements or freight intermodal transfer facilities may be funded only from Federal or other sources.

3. Local Sales Tax Measures

In California, seventeen counties have passed local sales tax measures for transportation. They did so to augment existing county and State gas tax revenue where their transportation needs exceeded available revenues. Included in these are major urban counties such as Los Angeles, San Diego, Orange, San Francisco, Alameda, and Contra Costa. Some rural counties such as San Bernardino and Imperial also participate. In most cases, the measures specified exactly which projects would be financed. Currently the counties collect approximately $1.5 billion in local sales tax measure money annually, with about half of this amount allocated for highway projects and half for transit purposes. There are no measure-funded truck or rail freight only projects, but many highway projects improve the efficiency of truck movements.

4. Article XIX Limitations on Freight Project Funding

Article XIX of the State Constitution limits the types of transportation projects that can be funded with State motor vehicle fuel tax revenue. Basically, the fuel tax can fund:

- The research, planning, improvement and maintenance and operation of public streets and highways (and related facilities), the mitigation of environmental effects, payment for property taken, and administrative costs.

- The research, planning and improvement of exclusive public mass transit guideways, including mitigation of environmental effects, payment for property taken and administrative costs.

These limitations essentially prohibit the use of State motor fuel revenue for private freight projects improvements for freight railroad tracks, intermodal facilities,

private airport and seaport access roads, or harbor dredging among others. It may be possible to fund such projects if it could be shown as the best way to mitigate an environmental impact of another transportation project. Also, improvements to railroad tracks or other rail facilities for passenger train service are permitted and these can often benefit freight rail service.

V. ACTION BLUEPRINT

This section presents the 42 actions recommended to improve goods movement transportation system in California, selected from the inventory presented in Chapter IV. This selection was based on the Action Evaluation Methodology as described in Chapter IV and applied as described in Appendix B. The actions as a group includes a continuum of projects and actions being planned, programmed, funded, and implemented. Many are already are in some stage of implementation. This action list will evolve over time as older issues are resolved and newer challenges arise.

This strategy presents an integrated approach that emphasizes cost-effective improvements, with an emphasis on applying new technology to improve system capacity, operations, and safety. For each action, an agency or governmental level that is responsible for or the lead in implementing an action is identified. This responsibility identification should be interpreted broadly, however. Most actions will require involvement from a number of stakeholders at the federal, State, and local level. In most cases, private sector involvement will be mandatory to make sure the most appropriate responses are planned, designed and implemented. The implementation time frame listed is also quite broad. Actions are described as either short term (i.e., to be completed in the next five years) or long term. The recommended actions are:

For more detailed description of the recommended actions see Chapter IV and Issue Paper #7.

A. Capacity Constraints/Network Development

Mobility and access are fundamental aspects of the transportation system. Traffic congestion and travel delay are identified as a primary problem by the goods movement industry.

1. Develop the State Highway System

a. Prepare Major Investment Studies/Corridor Studies

Major Investment Studies (MIS) and corridor studies, with specific freight emphasis, should be prepared on the High Emphasis Route corridors and gateway routes. MIS are a method to identify corridor needs in urban areas, project alternatives, and environmental conditions that would be encountered in developing or expanding facilities. In rural areas, corridor studies are generally the first step in the project development process. (Lead Agency: Caltrans/Regions; Short term.)

b. Evaluate Truck-Only Facilities

Caltrans should work with SCAG, the County Transportation Commissions in Southern California and other interested parties to evaluate the feasibility of truck-only facilities. Such facilities can address high volume goods movement demand and improve safety.
(Lead Agency: Caltrans/Regions; Short term.)

c. Improve and Rehabilitate Rural Highways

RTPAs, in cooperation with Caltrans, should identify improvements to rural State highways and arterial roads to ensure that these roadways can handle the size, weight, speed, and volume of trucks.
(Lead Agency: Caltrans/Regions; Long term.)

2. Expand Development of Grade Separations

Regions, in cooperation with Caltrans and other interests, should expand the identification and implementation of railroad/roadway grade separation projects along high-volume freight corridors.
(Lead Agency: Regions; Long-term.)

3. Expand Border Infrastructure

Federal, State, and regional agencies should continue to expand and improve the physical infrastructure at the California/Mexico international border. This development is Caltrans' identified NAFTA Net of facilities. (Lead Agency: Caltrans; Long-term.)

4. Facilitate Intermodal Terminal Development

Caltrans, regions and local agencies should assist in the planning, developing and funding of intermodal terminals. Such terminals provide greater intermodal access and system efficiency in the interchange of freight between modes. (Lead Agency: Regions/Private Sector; Long term.)

5. Expand Air Cargo and Seaport Facilities

Caltrans and regional agencies should assist California airports and seaports in converting former military installations to state-of-the art international trade terminals. Regional Transportation Planning Agencies (RTPAs) should take a more active role in airport planning, particularly of ground access needs (road and rail options) and intermodal transfer facilities.
(Lead Agency: Regions/Private Sector; Short term.)

B. Design Restrictions/Network Improvements

The geometric design of many highways routes and roadways do not meet current design criteria or needs to be upgraded.

1. Identify System Design Restrictions

Caltrans, RTPAs and the private sector, through freight advisory councils or other forums, should identify restrictions on the safe and efficient movement of trucks and identify improvements. (Lead Agency: Caltrans/Regions; Long term.)

2. Identify California's Extra-Legal Load Network

Caltrans, in cooperation with MPOs/RTPAs and private industry, shall identify and address the existing and projected corridors, routes, and facilities and demands for the movement of extra-legal permit loads.
(Lead Agency: Caltrans, Short term)

C. Operational Improvements

Operational improvements can optimize the operating efficiency of a single mode, traffic in a corridor, or the entire transportation system.

1. Implement State and Regional Transportation Information and Management Systems

a. Expand and Upgrade Regionwide Transportation Management Centers (TMCs)

The Caltrans/CHP Transportation Management Center Master Plan should be implemented. (Lead Agency: Caltrans/CHP; Short term.)

b. Develop Smart Traveler Systems

Caltrans should continue development of "Smart Traveler" systems. (Lead Agency: Caltrans/Regions; Short term.)

2. Optimize Local Arterial System

Regional and local agencies should identify and implement relatively low-cost strategies and actions to optimize the local arterial system to serve goods movement. (Lead Agency: Regions/Local Governments; Long term.)

3. Develop Border Operational Improvements

Caltrans and the CHP should continue to implement actions to facilitate the flow of goods across California's state and international borders, such as electronic credentials and load documentation transfer, revised customs procedures, and improved access routes. (Lead Agency: Caltrans/CHP; Long term.)

4. Improve Terminal Access

Regions and local entities should develop coordinated approaches to address airport and seaport terminal access. (Lead Agency: Regions/Private Sector; Short term.)

5. Standardize Exit Signing

Caltrans should investigate standardized exit signing that indicates distance along a route and relationship to other exits. Signing to commercial seaports should also be improved. (Lead Agency: Caltrans; Short term.)

6. Examine/Facilitate Freight Rail Operations

Caltrans, the California Public Utilities Commission, seaports, railroads and other interested parties should meet on an ongoing basis to identify and resolve freight rail operational issues that impact customer service levels, seaport and passenger rail operations. (Lead Agency: Private Sector, Caltrans/PUC, Short term).

D. Safety and Maintenance Improvements

1. Enhance Safety Monitoring and Warning Devices

The CHP should increase radar enforcement along major rural highways to bring about reductions in excess speed and other hazards. Caltrans should expand efforts to improve driver warnings of adverse weather conditions and appropriate operating speeds. (Lead Agency: CHP/Caltrans; Short term.)

2. Improve Grade Crossings Safety

Regions and local entities should identify grade crossings where improvements would increase safety and be cost-effective.
(Lead Agency: Regions; Short term.)

3. Extend Commercial Vehicle Inspection Station Operating Hours

The CHP should extend commercial vehicle inspection station operating hours to improve commercial vehicle safety and reduce road damage from overweight trucks. (Lead Agency: CHP; Short term.)

4. Develop In-Route Parking Facilities

Caltrans, regions, and local agencies should pursue development of safe in-route parking facilities for trucks, especially around seaports, international border crossings, and intermodal facilities in urban areas.
(Lead Agency: Regions/Private Sector; Long term.)

5. Improve Hazardous Materials Information Systems

The National Highway Traffic Safety Administration, the California Public Utilities Commission, CHP, Caltrans and private industry should jointly study the feasibility of, and develop if practical, a hazardous material incident response system. It should provide safety officials with data on vehicle loads, route information, emergency telephone numbers and material handling procedures. (Lead Agency: Federal Government; Short term.)

6. **Develop Intelligent Vehicle Initiative**
   Caltrans should continue its involvement with the federal government's Intelligent Vehicle Initiative (IVI). (Lead Agency: Federal Government; Long term.)

7. **Enhance High Emphasis Route Rehabilitation**
   Caltrans should work to reduce the backlog of pavement rehabilitation needs identified in the Caltrans 1995 State of the Pavement report.
   (Lead Agency: Caltrans; Long term.)

E. New Technology Development and Implementation

Transportation technology helps goods movement to become ever more productive and efficient. A vast array of technological applications are being developed. Many are particular to one goods movement mode; others operate across modes. Successful application of new technology depends on its technical, economic and institutional feasibility.

In the development of this strategy, it was intended to emphasize the application of new technology. Several of the actions recommended fall into this realm (e.g., Develop Smart Traveler Systems). However, for the introduction and application of new technology to take place, as a group certain fundamental generic actions must be taken. These actions include:

- Continue Research and Development (R&D) of Technology;
- Continue to Develop New Technology Standards and Protocols;
- Examine Legal, Institutional and Social Frameworks;
- Deploy the Core Foundation Intelligent Transportation Infrastructure (ITI);
- Expand ITS Applications to Support Intermodalism;
- Mainstream ITS; and
- Support Innovative Partnership Deployment.

The lead agency for these efforts is Caltrans, in partnership with the private sector. Depending on the time period, the time period for completion varies from short to long-term.

F. Funding and Programming Enhancements and Planning Needs

1. **Revise Programming Guidelines to Address Goods Movement**
   Caltrans, the California Transportation Commission (CTC), RTPAs, and County Transportation Commissions should revise programming guidelines and evaluation processes to give more equal consideration to goods movement project proposals. Requirements for Federal or State legislative relief from statutory or constitutional restrict on funding for goods movement projects should be identified.
   (Lead Agency: Caltrans/CTC/Regions; Short term.)

2. **Develop Goods Movement Project Funding Guidebook**
   Caltrans should develop a guidebook for MPOs, RTPAs, industry and other parties to identify funding sources for goods movement projects.
   (Lead Agency: Caltrans; Short term.)

3. **Expand Public/Private Partnerships**
   Caltrans should develop additional avenues to expand public/private partnerships in the funding of transportation projects and improve the process for receiving private contributions and payments for projects. (Lead Agency: Caltrans; Short term.)

4. **Advance Multistate and Multinational Transportation Planning**
   Caltrans should continue to participate in multistate and multinational transportation system planning efforts, such as the Western Transportation Trade Network Study and the Binational Transportation Study.
   (Lead Agency: Caltrans; Long term.)

5. **Prepare State Freight Rail Study**
   Caltrans should prepare a State Freight Rail Study, as part of its System Planning effort, and develop an overall long-term approach to improving freight rail system integrity, system performance, service availability, competition, and intermodal connections.
   (Lead Agency: Caltrans; Short term.)

6. **Develop Goods Movement Local Accommodation and Impacts Guide**
   Caltrans, in consultation with both local government and goods movement industry representatives, should develop a guide to help communities accommodate goods movement and help the goods movement industry, local officials, and the general public estimate the goods movement impacts of new development. (Lead Agency: Caltrans/Local Government; Short term.)

7. **Develop Goods Movement System Performance Measures**

Caltrans, in cooperation with the goods movement industry and federal, regional and local agencies should continue the development of system performance measures and indicators.
(Lead Agency: Caltrans; Short term.)

8. Enhance Goods Movement Analysis Tools

a. Enhance the ITMS
The Department's Intermodal Transportation Management System (ITMS) should be enhanced for goods movement planning purposes. (Lead Agency: Caltrans; Short term.)

b. Develop the CASP Air Cargo Module
An air cargo module within the California Aviation System Plan should be developed and brought on-line. (Lead Agency: Caltrans; Short term.)

c. Continue MPO/RTPA Freight Element Model Development
Development of freight elements within regional transportation models should continue and be coordinated with efforts of Caltrans and other MPOs/RTPAs. (Lead Agency: Regions; Short term.)

9. Improve Goods Movement Data Base
A Caltrans/regional agencies partnership effort should develop and update a comprehensive and multimodal goods movement database.
(Lead Agency: Caltrans/Regions; Short term.)

G. Policy, Regulatory And Institutional Improvements

1. Develop CVISN

The Commercial Vehicle Information Systems and Networks (CVISN) demonstration project should be completed, evaluated, and if proven successful, fully implemented. CVISN is a partnership between USDOT, CHP, Caltrans, DMV, the State Board of Equalization, and the California Trucking Association. (Lead Agency: Federal/State; Short term.)

2. Streamline Commercial Vehicle Registration Process
A process by which a third party agent can act as an agent for commercial vehicle fleet transactions, similar to what auto clubs provide for passenger

vehicle owners, should be implemented. (Lead Agency: DMV/Private Sector; Short term.)

3. **Foster Emission Reductions and Improved Freight Engine Technology**
   The state, together with the U.S. Environmental Protection Agency (EPA), the goods movement industry and other parties should continue cooperative efforts to reduce truck, rail, ship and aircraft engine emissions, while minimizing the economic impacts on the goods movement industry and California's economy. (Lead Agency: California Air Resources Board; Long term.)

4. **Examine Public Funding of Publicly-Owned Transportation Facilities**
   The California Transportation Commission (CTC), in partnership with Caltrans, regional agencies, local governments, and private industry, should review the rationale for the distribution of transportation revenues between the State and local governments. (Lead Agency: CTC; Short term.)

5. **Examine Rationale for Public Funding of Private Projects**
   Caltrans should examine the rationale for investing public funds in private goods movement transportation projects. It should assess the public and private benefits and costs of such public investments, identify how the public interest could be protected, and identify laws and regulations that require amendment to allow such investment. (Lead Agency: Caltrans; Short term.)

6. **Build Closer Working Relationships With Industry Representatives**
   Working relationships between the public sector and the goods movement industry should be enhanced. These relationships are vital if the issues affecting the movement of goods are to be understood and addressed. (Lead Agency: Caltrans/Private Sector; Short term.)

H. Ongoing Actions

Several actions listed in the Chapter Four section Alternative Action Inventory are ongoing activities. The following ongoing activities are expected to be completed within the next two years:

Operational Improvements

- Complete Implementation of Ramp Meters
- Fully Implement Electronic Toll Payment Services

Funding and Programming Enhancements and Planning Needs

- Target Funding Pilot Programs for Goods Movement

- Develop a California Maritime Policy
- Refine Caltrans Benefit/Cost Model

Policy, Regulatory and Institutional Improvements

- Streamline Seaport Dredging Review
- Amplify Caltrans Headquarters and District Communication

Appendix A

GOODS MOVEMENT STRATEGY ISSUE PAPERS

1. Goods Movement Transportation System Issues

2. Goods, Objectives and Policies

3. Goods Movement Transportation Network Inventory, Constraints, and Demands

4. (see paper 3)

5. Goods Movement Transportation System Recommendations

6. Existing Roles and Responsibilities

7. Alternative Actions Inventory

8. Goods Movement Action Evaluation Methodology

9. Goods Movement Funding Sources and Criteria

Appendix B

ACTION EVALUATION PROCESS

The inventory of actions was evaluated to develop recommended actions to be pursued in the upcoming implementation phase of the Goods Movement Strategy. The recommended actions are the high priority measures that Caltrans and its state, regional, local and private partners should undertake now and over the next five years to improve the goods movement system.

A list of evaluation criteria was developed as the first step in analyzing the inventory of actions. The evaluation criteria were derived from the evaluation approach described earlier in this report and in Issue Paper #8, "Goods Movement Action Evaluation Methodology". There are three categories of evaluation criteria: Responsiveness to the Strategy's Overall Goals, Objectives and Policies; Impact on System Performance; and Project Level Technical Consideration. Each of these categories have a number of factors that were used to evaluate the actions (see attached table).

Each action was analyzed for its affect on each of the 27 evaluation factors. A positive (+) score was given to an action that had a positive impact on the factor. An action received a negative (--) score if it had a negative affect on the factor. Actions that had a mixed effect, no effect or were not applicable to a factor received a neutral score (a blank on the matrix).

Four evaluation themes were used in the scoring process. First, actions of an overall, system-wide planning or analysis nature were evaluated on their direct results, not on secondary effects of the plans or analyses. This was done to differentiate these actions from ones that directly affect the actual movement of goods. The consequence of this evaluation theme is the system-wide planning or analysis actions have relatively little effect on the project level technical considerations and system performance criteria.

Second, actions were evaluated independent of who would be the lead agency for implementation. The impact of the action was the defining criteria, not what agency or entity that would be carrying the action out. The determination of the lead agency for implementation was done at a later step.

Third, the individual actions under the New Technology Development and Implementation category were evaluated together as a package of actions. This was done for three reasons. First, the action is vital, but has a long lead-time until the impact is fully realized (e.g., technology research and development). Second, some of

the actions are closely tied to or interdependent with other actions, making a synergistic impact on the evaluation criteria (e.g., mainstream ITS). Third, some of the actions are important, but are difficult to assess their direct impact on the evaluation criteria (e.g., examine institutional and social frameworks).

Fourth, on-going actions were identified as current activities, which would likely be finished in the near future (within two years). It was assumed that these actions were important and would be implemented independent of a recommendation from the Goods Movement Strategy. These actions were treated as a given and were not included as recommended actions for the Goods Movement Strategy.

A rough, projected cost range was then estimated for each of the actions. The cost estimation was done on a generalized, planning basis, given current information and anticipated conditions. The ranges were set at $5 million or less was considered to be low cost. More than $50 million was considered to be high cost. Medium cost was the range in-between $5 and $50 million.

An approximate benefit/cost ratio was then developed. The cumulative score an action received in the evaluation was deemed to be the relative benefit of the action. The cumulative evaluation scores ranged from 0 to 18. The relative benefits were classified into three categories: low benefit (0 to 6 score), medium benefit (7 to 12), and high benefit (13 to 18). The benefit/cost ratio was then determined as the action's benefit rating as compared to its cost range.

Each of the actions was examined regarding the viability of its implementation. This was done as a test for fatal flaws of the action. If an action could not pass any of the five implementation questions, it would be deemed fatally flawed, and not recommended for implementation, regardless of its benefit/cost ratio.

This step was also taken to develop a sensitivity factor for the actions. It was correctly anticipated that many of the actions would receive a moderate benefit/cost rating. An additional factor was needed to differentiate the actions recommended for implementation. The sensitivity factor is the action's cumulative score for the implementation questions. Three sensitivity factor ranges were used: negative (a score less than zero), neutral (0 to 2), and positive (3 to 5).

A benefit/cost matrix approach was then used to evaluate all of the actions. Actions with high benefits and low costs were recommended for implementation. Actions with low benefits and high or medium costs were not recommended for implementation. All of the other actions (those with high or medium benefit and high or medium cost; and those with a medium or low benefit and low cost) were judged to have a moderate benefit/cost ratio.

These actions with a moderate benefit/cost ratio were subjected to the sensitivity factor test for further evaluation. Actions with a positive sensitivity factor were evaluated with a leaning for including them as recommended actions. Actions with a negative sensitivity factor were evaluated with a leaning against including them as recommended actions. Actions with a neutral sensitivity factor were evaluated on the merit of the action.

Professional judgment was used throughout the evaluation process to assess the actions. Professional judgment was based on knowledge and experience of staff, as well as direction received from California Transportation Plan Executive Committee, Policy Advisory Committee, and input from the public workshops held on the goods movement strategy.

A final, overall review was used to ensure the recommendations made sense. The benefit/cost approach was intended to help guide the evaluation of the actions, but not be an absolute rule. As with the theme for system performance measures, the benefit/cost approach was a tool, not a rule for evaluation.

The final result of the evaluation process is 42 actions recommended for implementation, which are listed in the action blueprint section of the strategy. A summary of the action evaluation is shown in the following table.

CTP Goods Movement Strategy
Evaluation Matrix